A CHILTON PUBLICATION

the Iron Age

NATIONAL METALWORKING WEEKLY

February 7, 1952

NTS PAGE 2

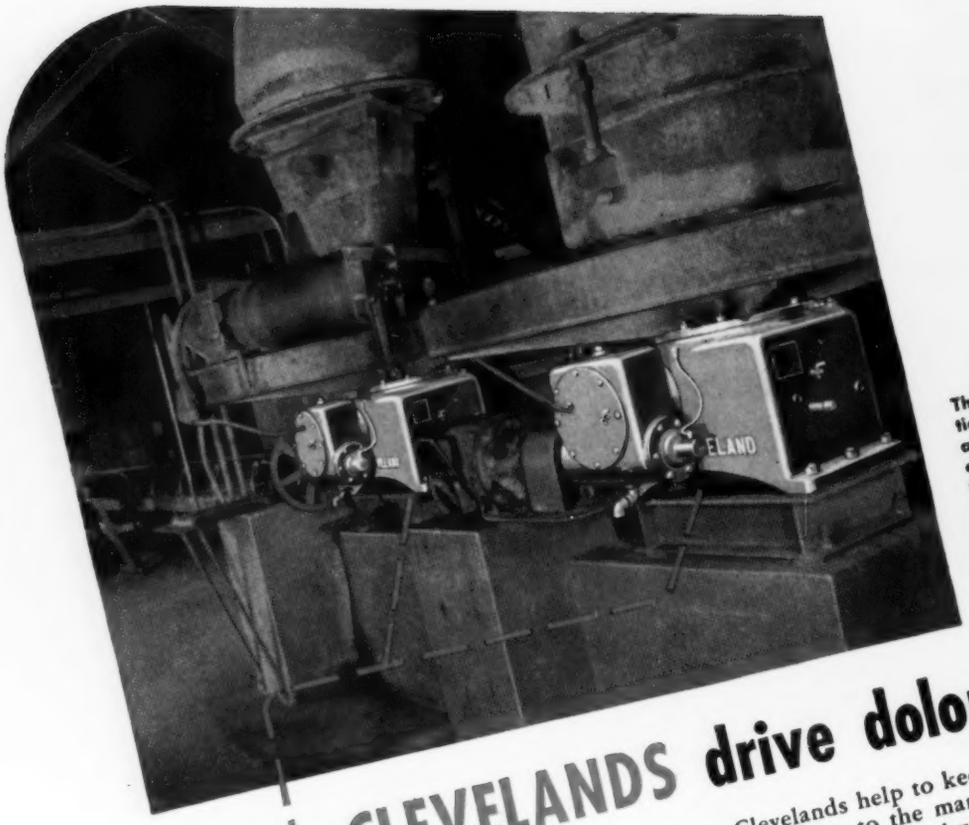
Pouring Open Hearth Steel . . .

at MESTA

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA



These are Cleveland vertical units in a stone preparation plant. They drive a feeder table which transfers crushed stone from storage bins above to a conveyor belt, on the way to kilns for dead burning.

Trouble-free CLEVELANDS drive dolomite feeder

SERVING day-in, day-out, these Clevelands help to keep the steel mills running. They contribute to the manufacture of dead burned dolomite—a refractory material with which open hearth furnace bottoms are maintained.

In metal production and fabrication, as well as in the wide spread supporting industries like this one, there are thousands of Cleveland worm gear speed reducers and worm gear drives—many of them in operation thirty years and more.

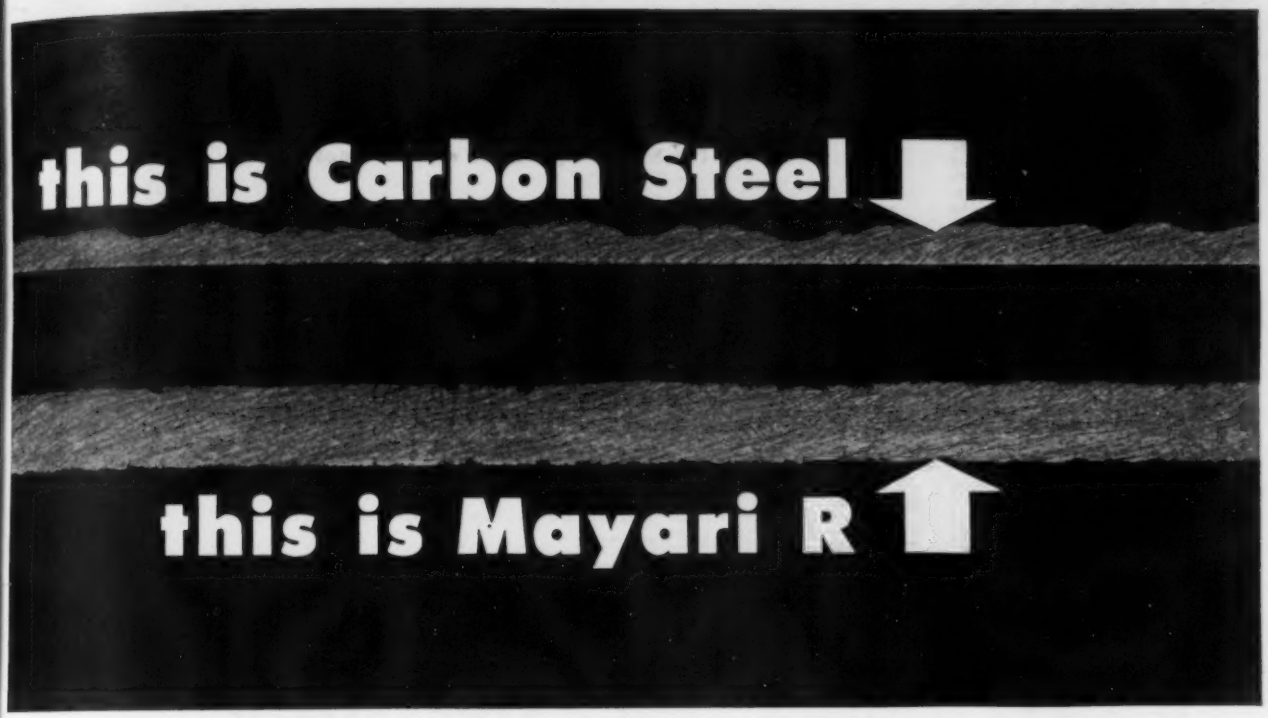
Since 1912, Cleveland has concentrated its entire engineering and manufacturing effort on a single product—worm gearing. It has always emphasized the four basic factors of correct design, finest quality materials, up-to-date manufacturing facilities and precision workmanship. As a result, wherever industry needs dependable drives—drives that will operate continuously under heavy loads, for long periods of trouble-free service—there you're likely to find Clevelands at work.

In or near your city there's a Cleveland engineer ready to serve you. He will be glad to discuss your power transmission problems and suggest proper drives to meet your particular needs. The Cleveland Worm and Gear Company, 3252 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication.
In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

AFTER 5 YEARS' EXPOSURE...



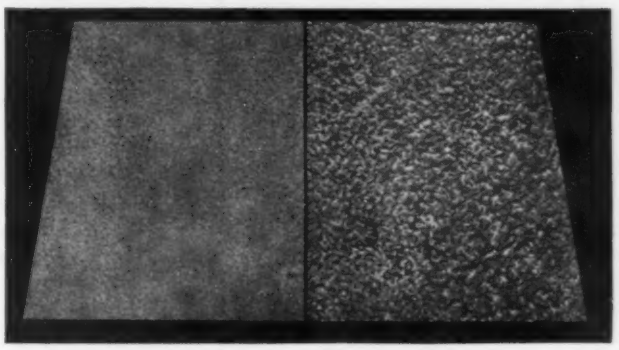
This unretouched photograph shows cross-sections of a carbon steel sheet and a Mayari R sheet after exposure. The photograph is approximately 4 times actual size.

You can see what corrosion has done to these steel sheets. One is plain carbon steel, the other is Mayari R, and both were originally ⅛ in. thick. They were exposed together in industrial atmosphere for 5 years. During this period the carbon steel sheet lost so much through corrosion that it had to be replaced, but there was no appreciable loss of thickness in the Mayari R sheet.

There is a simple reason why Mayari R has such excellent resistance to atmospheric corrosion. When this steel is exposed, a thin, tight layer of rust forms on the surface to act as a protective coating. This rust does not flake off in the manner of carbon-steel rust. Instead, it holds securely to the surface and retards any further corrosive action. As a result, Mayari R has from 5 to 6 times as much resistance to atmospheric corrosion as plain carbon steel, and from 2 to 4 times as much as copper-bearing steel.

Mayari R also has other advantages. It has better abrasion-resistance, higher yield point, and greater tensile strength than ordinary carbon steel. It can be used to save steel, to reduce surplus deadweight, and to increase the service life of equipment and structures.

Our Catalog No. 259 contains more information about Mayari R, its properties and applications. Write or call the nearest Bethlehem sales office for a copy.



The same test specimens as seen from above. After 5 years' exposure the Mayari R is relatively smooth while the carbon steel is deeply pitted.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

Mayari R *makes it lighter... stronger... longer lasting*

IRON AGE

FEBRUARY 7, 1952
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DIGEST

of the week in metalworking

COAL BADGERED BY SAFETY, WAGE PROBLEM

PAGE 93 Coal men won't call the chances of John L. Lewis pulling a strike but they have reasons why he shouldn't do so. Industry stockpiles of coal run about 80 million tons and may increase. That's a huge backstop against labor trouble. Producers are selling below ceiling and can't be generous.

AIR FORCE CUTS OTHER CHICAGO CONTRACT

PAGE 95 After dropping its Fairchild C-119 contract at Chicago the Air Force last week awarded to Ford Motor Co. a $30 million contract to build J-57 jet engines in a plant which had been reactivated to build $565 million worth of reciprocating engines. This also points out trend to jet planes.

TEST MODEL TIN CAN COLLECTION PLAN

PAGE 97 Need for steelmaking scrap is so desperate that again the lowly tin can is being considered for salvage. Steel industry representatives have decided to find out once and for all if tin can collections are feasible. First test city was Hornell, N. Y. Other sites are Trenton and Elizabeth, N. J.

RAILROADS MAKE BID FOR MORE STEEL

PAGE 99 The railroad industry's resentment against government regulation is finding another outlet—CMP steel allotments. The industry claims that its ambitious freight car building program will bog down from an ideal 10,000 cars a month to just over 5000. Steel for rebuilding is also short.

OPS LAYS GROUNDWORK FOR STEEL RISES

PAGE 113 Higher steel prices are definitely in the offing. OPS continues close-mouthed on calculations for Capehart increases but the agency is putting final touches on procedures to be used. Claiming a possible overburden of clerical work, some OPS men rejected a plan for applying a strict deadline.

WAR WORK WON'T CURE AUTO LAYOFFS

PAGE 118 Throwing in additional defense contracts in auto plants will not take up enough of the civilian car cutback slack to solve Detroit's unemployment problem, auto executives told a government task force which is studying the problem. The blame is put squarely on Washington for major defense errors.

WHY BULLARD LATHE OUTPUT WAS DELAYED

PAGE 125 Fisher Body's contract to produce Bullard vertical turret lathes has not been canceled—merely held up pending study by the Munitions Board on how many will be needed. Fisher won't lose its contract to build machine tools. Other types may be built. Contract provides for compensation.

NEW FORGING TECHNIQUES DEVELOPED

PAGE 135 Techniques have been studied for forging of aircraft outer skin panels. Parts are thin, and have integral stiffening ribs. Forgings thinner than 0.1 in. have been made, with draft angles as low as 1°. Areas of forgings are greater than conventional practice would indicate is possible.

WATCH LEAD-TIN PLATING ADDITION AGENTS

PAGE 139 Close control over addition agents is needed for best results in lead-tin plating. Small amounts of copper, antimony, or arsenic increase strength and fatigue resistance. Gelatin or glue in the bath gives a fine-grained deposit. Resorcinol minimizes resulting change in deposit composition.

WELDING TECHNIQUE STOPS INTERNAL RUST

PAGE 142 Hermetic welding has successfully stopped internal corrosion of tubular aircraft structures such as engine mounts. Over 200,000 such parts fabricated by one plant in past 9 years have given satisfactory service. Newer, more sensitive leak detection methods spot flaws, improve welding.

UNION, GOVERNMENT PUT SQUEEZE ON STEEL

PAGE 205 Steel labor developments indicated a strategy of squeeze on steel company profits. Higher taxes have already narrowed profit margins sharply. Now industry has been shown a proposed price order to permit Capehart increases. Steel people fear a formula to cover a wage hike.

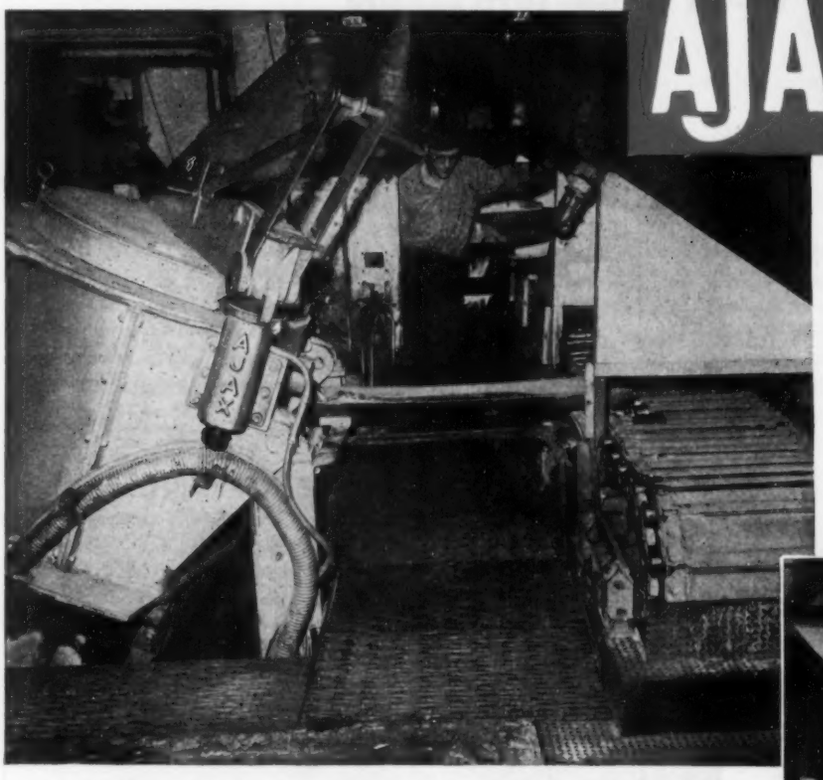
TOOLING INNOVATIONS FOR SMALL PARTS

NEXT WEEK Here are small parts tooling ideas from Buick, both on mass-production and on small-lot jobs. A simple rig replaces a pitch-line chuck in gear production. A special machine burrs holes on 8000 small pieces an hour. A simple screw machine pickoff device prevents finished part damage.

MILLIONS of POUNDS

of Aluminum per year reclaimed with the help of

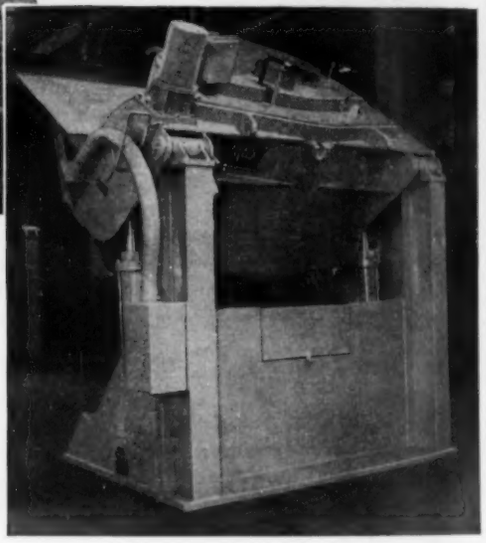
AJAX INDUCTION FURNACES



166 kW AJAX Induction Furnace in tilted position, pouring molten aluminum alloy through a coated trough into ingot molds on conveyor.

MAJOR AUTO MANUFACTURER RECOVERS SCRAP FROM MACHINING OPERATION BY MODERN MELTING PROCESS

Here is an interesting setup for reclaiming aluminum alloy chips, which is installed adjacent to the piston casting setup in one of the largest automobile manufacturing plants in the country. More than half of the aluminum needed for pistons in this plant comes from this scrap recovery program. A considerable net profit is realized, and aluminum purchases are lowered.



Above is a 330 kW furnace. AJAX Engineering Corporation manufactures low frequency electric induction furnaces in a great variety of sizes ranging from 20 to 1000 kW. This type of equipment has been adapted to the full range of nonferrous metals and alloys.

Send for Reprint of Article on Scrap Recovery by Induction Furnaces

AJAX ENGINEERING CORP., TRENTON 7, N. J.

AJAX TAMA-WYATT

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

The Iron Age
FOUNDED 1855

The Big Discussion

T. A. (Typical American) Jones had read about the President's budget. It was quite a subject so he was talking it over with his pal George Smith.

"George," said T. A., "I see where we are going to spend more than $85 billion in the next fiscal year and that we may have a deficit of $14 billion. What I want to know is how we can spend so much more dough than we get."

George had been doing some quick reading on the subject too. "Listen, T. A., we need to spend all that dough to protect us from communism. We will get the money some way. Everything will come out right."

"I don't say we are going to perdition in a wheelbarrow," mumbled T. A., "but some day we have to pay up, don't we?"

"T. A.," replied Smith, "those government economists who report to the President say that we have so much national income that we don't have to worry about how much goes out. Seems as if the debt can be bigger and it is all right for the government to owe itself."

"Yes, I've heard that argument," said T. A., "but it doesn't make sense to me. You can't keep on spending something which you don't have—and besides, all these raises we get don't mean much because prices and taxes go up and the value of the dollar goes down."

George Smith took another swig of coke. "Look, T. A., relax and quit worrying, the world isn't coming to an end. What you want to do is live for today and let someone else take care of tomorrow. The thing is getting too complicated for me."

"Sure," said T. A., "but what worries me is that you can't just live day to day. Someone has to pay for these newfangled economic theories. It doesn't look good for our country's future.

"Look, T. A., let them spend all they want. By the time the thing comes to a head you and I will be pushing up daisies and our children's children will be wrestling with the thing. Relax friend."

Sadly to himself T. A. said, "If enough people think like George it means curtains for all of us."

Tom Campbell

Editor

Here's a record...

that few have ever seen!

Ninety-nine out of 100 metallurgists and heat-treaters have not yet had a chance to see a continuous instrument record of the carbon in a furnace's carburizing gas. And probably not 99 out of 10,000 production men have seen such a sight.

But neither group is going to be unfamiliar with this advance for much longer, because this valuable information is now as easy to get as a temperature record. It comes from a Micromax Carbon Recorder, which is part of the brand new L&N Microcarb Control.

Already several dozen plants have ordered Microcarb equipment. Here and there a present user is letting his friends drop in for a peek. So, the Carbon Record will soon be pretty generally known to men who look for the modern way to cut carburizing costs or improve carburized parts.

Every metallurgist and heat-treater will probably have his own idea as to exactly what this instrument can mean in his plant. Technically, it shows only the percent of active carbon in the atmosphere of a Homocarb Furnace; but practically, it shows the surface carbon content of the parts being carburized! Used with Microcarb Control, it means that "the carbon you set is the carbon you get." You can control the surface carbon, regardless of whether you want a shallow or deep case; on familiar steels or the newer alloys.

Only Homocarb carburizing equipment of our new Series H can be used with Microcarb, because the furnace and its temperature control must be designed to meet the needs of atmosphere regulation. Specific features are a soundly designed electric furnace with solid-bottom retort, improved fan housing and work support, and aerodynamically designed discharge jets. Micromax temperature control of the Duration-Adjusting Type is included.

The full Microcarb story will be mailed on request. Address either our nearest office, or 4956 Stenton Ave., Philadelphia 44, Pa.

LEEDS NORTHRUP

Jrl. Ad. TD4-623(6)

Dear Editor:

Letters from readers

What Price Conformity?

Sir:

We don't know what we would do if there wasn't someone qualified as you are to put our thinking into words.

Some weeks ago when we saw this blowup in *Life* magazine on the future executive, all we could do was some very private swearing about such a situation.

We have noted the subleties in your editorial "What Price Conformity?" in your Jan. 24 issue and are thoroughly enjoying looking at this problem through your well-expressed viewpoint.

It is a fact that things are really getting into a hell of a mess.

F. A. HENNINGER
Vice-President
Charlotte Tank Co.
Charlotte, N. C.

Valuable Statistics

Sir:

We congratulate you on your Jan. 3 issue. There are many outstanding features and valuable statistical information, including the section showing Defense Controls and Personnel Directory, pp. 327 to 348.

H. E. HUBBARD
Purchasing Agent
Consolidated Machine Tool Corp.
Rochester, N. Y.

Electroforming

Sir:

We are interested in the article "Electroforming Solves Special Production Problems" by John Kolb, appearing in your Dec. 6 issue, and should appreciate it very much if you would tell us the names of companies engaged in this special type of work.

M. W. IMBRIE
Eastern Laboratory
E. I. du Pont de Nemours & Co., Inc.
Gibbstown, N. J.

Among the companies engaged in electroforming are: Camin Laboratories, Inc., 104 S. 4th St., Brooklyn 11, N. Y.; Bart Laboratories, Inc., Belleville, N. J.; and Bone Engineering Corp., Glendale, Calif. —Ed.

Interpretation

Sir:

The Metallurgical and Research Committee of the Forging Manufacturers Assn. reviewed Mr. Bargett's article "English Use Boron in Normalized and Drawn Heavy Sections," appearing in your Jan. 10 issue.

We feel that the word "heavy" in the title is very misleading and was used inadvisedly. Along toward the end of the article the first reference to size occurs on p. 83 and a 2-in. round bar is the largest section to which any factual data are associated.

The word "heavy" to a producer of commodities such as needles or spark plugs would probably imply the sections referred to in your article. To a producer of heavy forgings the sections referred to in your article are smaller than practically any associated with our product.

The producers of heavy forgings are being continually urged, by those who are not thoroughly familiar with the situation, to use boron to replace other alloys. To the best of our knowledge, and the National Academy of Sciences—National Research Council has not given any contrary evidence, boron is not effective in normalized and tempered parts and that a section of about 3 in. is the largest on which boron is useful as replacement of strategic alloys.

What disturbs us is that many will see the title and without further investigation and reading the article throughout will accept the implication of the title. This just further befogs the picture which we have spent considerable time to clarify and which we can now see some benefits of our endeavors.

A. P. SPOONER
Chairman, Metallurgical & Research Committee
Forging Manufacturers Assn.
Bethlehem, Pa.

Automatism

Sir:

Could you send me some references on automaton or automatism in industry? The only specific reference I have to recent developments is a short note on p. 77 of your May 17, 1951, issue which speaks of the iron hand for removing stampings from dies soon to become available in Detroit.

More information on this development and on any similar developments would be much appreciated.

J. J. BROWN
Aluminum Co. of Canada, Ltd.
Montreal

We have published two articles entitled: "Large Stamping Plant Features Mechanization," Dec. 20, 1951, p. 100; and "Automatic Transfer Presses Increase Stamping Output," June 2, 1949, p. 60.—Ed.

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THE OHIO ELECTRIC MFG. CO. • 5900 MAURICE AVENUE • CLEVELAND, OHIO

CHESTER BLAND, *President*

Ohio ELECTRIC

A-2038

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

► Some manufacturers of durable goods (excepting automobiles) are stretching steel supplies by as much as 15 to 20 pct by using thinner steel gages. Unit output has been cut but not nearly as much as total steel tonnage used—which of course is quite satisfactory to government control agencies.

► One government agency is considering letting a development contract for hot extrusion of titanium tubing. The French Sejournet process will be used if the deal is closed.

► Combination grit blast and pickle lines for stainless steels have proved so much cheaper to operate that most producers expect them eventually to replace caustic bath cleaning lines.

► A great proportion of defense contractors prefer to buy standard machine tools wherever possible—feeling that special machines could not be applied to civilian goods production after the "emergency."

But there is a lot to be said on both sides of the question because some special machines could later be modified by changing heads, adding or deleting elements, etc.

► Return of metals allotted to the Air Force is just the windfall NPA needed to make its Controlled Materials Plan "honest." Much of the material will be used to honor tickets for which holders couldn't find a home. In other words, there was an over-allotment for civilian goods, an over-estimate by the Air Force.

► At least part of official Washington is convinced that some civilian industries were cut back too soon and too far in anticipation of huge defense orders. The lag in defense has left unemployment (relatively small now), unwieldy inventories (getting heavier), and a softening market (getting softer) for some steel products.

Washington is trying to repair the damage by steering defense orders to small business and areas of unemployment—regardless of cost. This doesn't hide the faulty planning by the military.

► Talk of holding steelworkers wages within Wage Stabilization Board formula limits has practically disappeared. Not that the formula has been discredited; but no realist believes the Administration will hold the line.

Exit of Price Administrator DiSalle is expected to pave the way for expedient alteration of price control to accompany a wage boost.

► Some stainless steel producers are melting as much as 80 pct of their total tonnage as straight chromium grades. Controversy still rages as to whether 17 pct Cr or 21 pct Cr is the better substitute for 18-8.

► Naval Ordnance has converted a standard IBM card programmed calculator into the equivalent of a room-size electronic brain. A special control panel permits generation of elementary trigonometric, hyperbolic and exponential functions and their inverses to seven decimal places in one second. The computer can print, punch, or retain the answers.

► An unconfirmed report from the Eastern Zone of Germany states that the Soviet Magnitogorsk steelworks last year converted a sixth blast furnace for "high pressure operation". Average production increase of 20 pct is reported, along with an 11-pct reduction in coke consumption.

The report concludes, "The team of friends, Ssasonenko, Poluchin, and Mudanow have taken over the sixth furnace to further develop the experiences of the collective."

signs of CMP THINSTEEL warehouse service

These three steel warehouses normally carry in stock the complete range of cold rolled strip steel specialties made by The Cold Metal Products Company, including low carbon and high carbon analyses, tempered spring steel and stainless grades in the 300 and 400 series. Supply problems are now very difficult. Currently, shortages exist in some grades and sizes, but within the limits of inventory possibilities strip steel fabricators continue to find justification for the descriptive phrase long identifying all Precision produced CMP products—"More feet per pound—more finished parts per ton."

IN THE EAST IT'S
THE KENILWORTH STEEL CO.

Located in the metropolitan New York area for quick service throughout the east. 750 Boulevard, Kenilworth, N. J. Phones: New York—COrtlandt 7-2427; New Jersey —UNionville 2-6900.

IN THE MIDWEST IT'S
PRECISION STEEL WAREHOUSE, INC.

Well known in the Chicago district for good service and careful attention to customers' requirements. 4409-4425 West Kinzie Street, Chicago 24, Illinois. Phone: COlumbus 1-2700.

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THE COLD METAL PRODUCTS CO.
OF CALIFORNIA

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COAL: Wages, Mine Safety Rear Up Again

Coal industry's future is bright but present is rugged . . . Mine owners feel UMW's Lewis is on shakier ground concerning wage rise . . . Try for federal safety code—*By T. Metaxas.*

On the coal industry's docket of current affairs are mine safety and labor negotiations. Patient and durable, coal has claimed an ambitious future for itself after the "transients" (natural gas and oil) burn themselves out. But the present is harder and coal must continue to meet recurring problems of mine safety and labor.

Last week Harry M. Moses, Bituminous Coal Operators Assn., and Joseph M. Moody, Southern Coal Operators Assn., waited in Washington for a messenger who never arrived. He was expected to deliver formal notice from John L. Lewis, union head, that the 60-day get-ready period before Mar. 31 expiration of the coal-union contract had begun. The open-end contract was thus pushed a few days beyond Mar. 31, automatically extending itself. At press time this week the producers were still waiting.

It meant that Mr. Lewis was willing to stall until his position could clarify. The steel wage settlement is still in flux. Higher wages for steelworkers will be part of the fulcrum on which Mr. Lewis will try to lever a wage rise out of the coal industry.

Coal producers would rather predict next year's weather than try to fathom if Mr. Lewis will call a strike or not. But they do feel that he stands on shakier ground today while economic factors make it difficult for producers to yield heavy concessions.

Coal stockpiles in the backyards of industry should seem ominous to Mr. Lewis. About 80 million tons have been amassed and more may be heaped on in preparation for a coal strike. These are fat reserves for industry to sustain itself during a strike. Meanwhile the 22 pct of non-union coal industry tonnage would keep producing. The crisis point on coal supplies does not dangle too close to Mr. Lewis' reach.

While the Administration ardently wishes to halt a steel strike in its tracks by cuddling the union and cajoling the steelmakers, it may not offer the same consideration to Mr. Lewis. Steel is the spine of rearmament and is in immediate shortage but coal is comparatively plentiful. If Mr. Lewis' demands exceeded the Administration's idea of what is just, it could be more inclined to let him go ahead and strike.

The coal industry has faulty economic defenses against a wage rise. Since World War II coal has had two heavy wage boosts. Freight rates and other costs have risen. Meanwhile prices have showed much less verve for climbing. Average price of run of the mine bituminous coal, f.o.b. New York City area, was $9.235 per net ton in 1948. In 1950 it was $9.753 per ton and last year it eased over the $10 per ton mark.

The average return of one large coal district in the first 9 months of 1951, figured against replacement costs, was less than one-half pct after taxes, almost a loss.

Coal operators are selling coal under OPS ceiling prices. Even if Washington were willing to grant Capehart price increases, coal producers must face realities of demand. They could not raise their prices to the limit to counterbalance wage rises. Steel does not have this problem.

Some rise in the price of steel is certain. But it may be considered inadequate by mills who would then be unwilling to see labor costs of an important raw material spurt up. This may stiffen mills' resistance to wage rises in their coal mines.

CORRIDOR CHAT. John L. Lewis talks with Sen. James Murray (right) and Rep. C. W. Bishop (center), outside the current federal mine safety hearings.

WAGES: Asks Halt of "Economic Jag"

U. S. Steel's Fairless opens steel industry's case before wage panel . . . Blames controls for leading to impasse while industry becomes battleground . . . Guaranteed wage case.

Ben Fairless, U. S. Steel president, opened the industry's case before the steel wage panel in New York Monday with a strong plea to stop inflation, which he called an "economic jag."

He blamed federal control policies for the current wage impasse. The contest, as he sees it, is between the United Steelworkers of America and the government, with the government's economic stabilization program at stake. It has simply been the steel companies' misfortune to become the battleground on which the contest is being fought, he said.

Chides Economists — The U. S. Steel president said total economic demands of the union would amount to more than $1,000 a year per employee. Granting this without a price increase he estimated "conservatively" would mean a Federal tax loss of $11 billion. Adding this to the Federal deficit would mean further dilution of our money supply and *more* inflation at the source of *all* inflation.

He chided Administration economists who pitch their argument for higher taxes on the need for the government to act in the public interest to siphon off excess purchasing power now in the hands of consumers. "In the name of common sense, what is the earthly use of siphoning off $5½ billion of consumer purchasing power—as Congress did through the last tax bill—and then turning around and siphoning *back* to the consumers $11 billion dollars that would otherwise go into the Federal Treasury?"

Refutes Union Claims—Mr. Fairless strongly denounced claims that union wage demands aren't inflationary. "At no time have union leaders proposed that our men should do more work or produce more goods in exchange for higher wages they are seeking. "On the other hand they have complained about 'fair day's work' standards, called for longer vacations at higher pay, asked limitation on output and incentive plans, and demanded large sums for no work at all in the guise of a guaranteed annual wage."

The United Steelworkers proposal on the guaranteed annual wage, as presented to the Wage Stabilization Board panel, took a form somewhat different from what the industry had anticipated.

In effect, the union proposes that the steel companies contribute to a trust fund out of which unemployment benefits would be paid for a maximum of one year, or until the fund becomes exhausted. Murray W. Latimer, a union consultant, estimated such a fund could be supported by contributions of 6½ to 7¢ an hr.

Under the proposed plan, benefits would be limited to persons of 3 years or more seniority laid off or terminated because of curtailment of work. Benefits would be payable for no longer than 52 consecutive weeks in any spell of unemployment. The overall benefit would be 30 times the standard hourly wage rate. And the plan would, to the extent possible, pay the difference between any state unemployment benefit and the overall benefit.

Continued

Bulk of the coal industry is lined up with the Bituminous Coal Operators Assn. The Southern Coal Operators Assn. will not carry a strike alone. But if the larger group refuses to yield, southern producers may prove an adamant ally.

Mr. Lewis has been assessing miners $2 a month to erect a bulwark against trouble. Funds may total over $2 million before the end of March. Some producers feel the potency of this cash stockpile is overrated when coal reserves and other economic factors are weighed against it.

Producers do not doubt the sincerity of Mr. Lewis in protecting his mine workers from shaft dangers. But they read between Mr. Lewis' altruistic lines spoken before the Senate Labor and Public Welfare Subcommittee dangerous ulterior motives.

Springboard for his attempt to push through federal power to shut down mines for safety violations is the West Frankfort, Ill., Orient Mine disaster which entombed 119 men. Mr. Lewis wants to give Bureau of Mines a law with teeth in it and is not content with the advisory powers it now has. Producers call them fangs.

Coal men say the mine chief has considerable power with the Bureau of Mines and could sway that agency into safety decisions advancing the unionization cause. It would also be a handy weapon to point across the bargaining table. Coal men believe that a law providing shutdown authority will never reach the Congressional floor—but fear that if it somehow does, the sullen mood of Congress on the coal disaster may force its passage.

Some coal men would not be critical of federal minimum safety mining laws—as long as they were objective and outside Mr. Lewis' influence. Smaller producers would flatly resist not only as a matter of principle but of economic necessity. These men say that state mining inspection teams, company programs, and the union's own safety committee are adequate.

PLANES: Air Force Cuts Contracts

Chicago hit by changes in volume, models . . . $565 million R-4360 order switched to $30 million J-57 jet contract . . . Will release machines to government pool—*By K. Bennett.*

Three weeks ago, Air Force dropped its Fairchild C-119 contract at Chicago with an audible clatter. Fairchild had been preparing to build 165 cargo planes in a reactivated plant in which Douglas built bombers during World War II.

Last week brought a second thud from Chicago. Ford Motor Co. received a $30 million contract to build J-57 jet engines at Chicago, in a plant which had been reactivated by Ford Motor Co. and the Air Force to build $565 million worth of Pratt & Whitney R-4360 reciprocating engines.

These would seem to indicate two things. (1) The aircraft slowdown has arrived with a bang. (2) The turbojet engine will replace the reciprocating engine as the Air Force heavy duty workhorse.

The Plan—The Ford Aircraft engine plant at Chicago is one of the world's largest. For rehabilitation of this sprawling 480 acre plant, the Air Force had authorized expenditures of $17 million in its initial contract. About 2000 smaller metalworking plants had been signed up as subcontracting suppliers of component parts. As of the original Air Force contract (for R-4360 engines), 20,000 workers would have manned the plant at full production, which had been set roughly for the first quarter of this year.

When the new $30 million turbojet contract was announced by the Midcentral Air Procurement District at Chicago, on Wednesday morning last week, about 8700 workers were employed in the plant. Over 5000 machine tools had been moved onto the production lines. The forge had gone into operation in March of last year and the in-plant magnesium foundry in May 1951. Before engines were coming from the assembly lines, magnesium castings and items from the forge plant were being shipped to Pratt & Whitney assemblers at other points.

On Dec. 24, 1951, the giant labored and brought forth its first R-4360 as a pilot model. It was a test run for both production line and personnel.

More Trouble—Thus in 3 hectic weeks, Chicago, already staggering with blizzards and the horse-meat scandal, saw one major aircraft facility scratched from the board and a second receive a slashing cut in contract value and a complete switch of product.

At Fairchild, 800 employees would be freed for other jobs. About 200 machine tools and 600 jigs and attachments would go back into government reserves for use by other defense contractors. "Hundreds" of orders to vendors for material were being cancelled. No subcontracts had yet been signed with suppliers.

From Fairchild's home plant at Hagerstown, Md., came word of a second cutback on Wednesday of last week. Fairchild cut its work week there to 35 hr to avoid laying off 1000 workers.

Spread the Cost—Referring to the new Ford contract, Air Force spokesmen said, "The decision to produce J-57 engines in the Chicago plant was dictated in part by the desire of the Air Force to spread the overhead cost of operating that plant over more production than is presently contemplated for the R-4360 engine."

The J-57 engine will be used in our new turbo-jet powered heavy bombers, the Convair YB-60 and the B-52. Both mount eight engines and will put the B-29 in the medium bomber class. The R-4360 was used in the B-36.

HOT STUFF: Pouring a casting in the in-plant magnesium foundry at Ford's Chicago aircraft plant now to be used for J-57 jets.

Aluminum Plant Gets Green Light

Signature of Interior Secretary Chapman last week to a 30-year power contract opened the way for another aluminum plant in Arkansas.

The Reynolds Metals Co. projected plant will produce an estimated 55,000 tons of primary aluminum. Last week the company had not yet decided on which of three possible sites—Arkadelphia, Benton and Helena—to use for the new facilities.

Responsibility for power will be split between Arkansas Light & Power Co. and the Southwestern Power Administration.

IRON ORE: Steep Rock Steps It Up

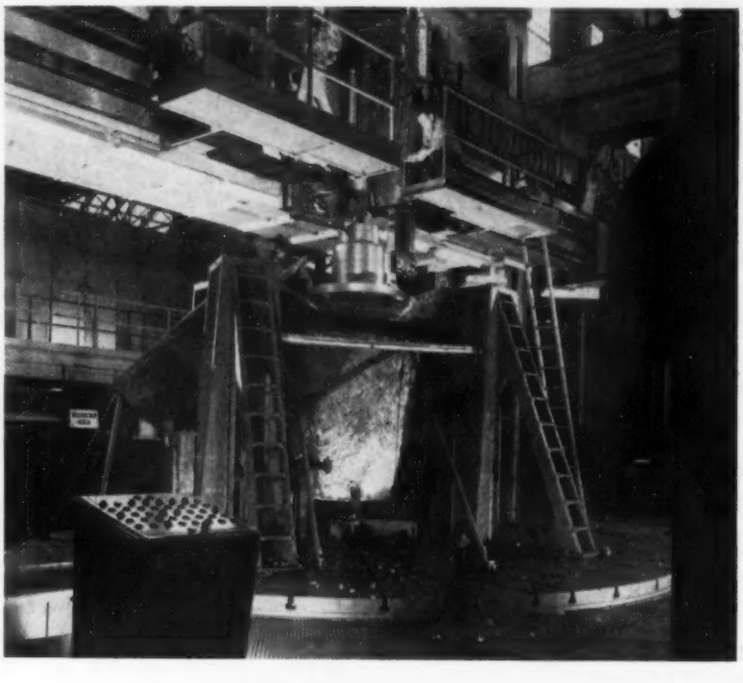
Canadian ore producer raises expansion sights to 5 million tons by 1956 . . . Bases growth of output on large reserves of high grade ore and an assured market . . . List timetable.

Steep Rock Iron Mines Ltd., Canada's major iron ore producer operating in the Atikokan section of Ontario, is considering increasing output to 5 million tons a year by 1956. Last season Steep Rock produced 1,326,724 tons of iron ore. This expansion will cost about $4 million.

An earlier expansion program called for an annual rate of 3,500,000 tons by 1955. But large reserves of high grade ore and an assured market inspired a greater growth. The time schedule also has been advanced. The new program follows closely upon the discovery of the "G" ore body, which lies between the Errington and Hogarth mines.

Current Goal Stands—The 1952 ore goal still remains at 1,200,000 tons. It will come from the Errington open pit. The 1953 shipping season calls for 1,700,000 tons, to come both from the open pit and underground, as well as some open pit production from the Hogarth mine. As the latter mine develops, output will be jumped to 2 million tons in 1954 and over 3 million tons in 1955. The 5 million-ton objective is scheduled to be reached in 1956.

While company officials make no calculation on ore reserves, other than the 71 million tons formerly estimated, mine engineers estimate 200 to 300 million tons in the first 1000 ft in depth in the middle arm of the lake where all work now is being concentrated. Expanding steel guarantees a market.



Boring Mill Adopted for Use as Lathe

A 30-ft boring mill is being used as a lathe for vertical machining on a current job at Allis-Chalmers Manufacturing Co. This unusual application was developed for work on two adjustable pitch Kaplan-type runner vanes for the hydraulic turbines Allis-Chalmers is building for Tennessee Valley's Pickwick Landing plant.

Completely assembled, the vanes will each be nearly 24½ ft in diam. A lathe for this size job would need a 20-ft swing, with centers carrying a weight of 14 tons. By placing a center on the machine's table and a tailstock on its rail, machining is performed on the boring mill.

Steel:

Conversion to boost oil and gas country quotas at least 5 pct.

Steel supplies for oil and gas country operators during the second quarter will be increased by at least 5 pct through the use of conversion steel.

Indications are that such operators will take a minimum of 25,000 tons of conversion steel. Control officials said this would not be charged back against their regular second quarter allotments amounting to about 425,000 tons.

Previously, operators have been reluctant to accept the higher cost steel because it would be charged against their future regular allotments of steel.

May Bring More—Under the new system, acceptance of conversion steel may even work out to the advantage of the operators. If conversion steel is used to increase drilling programs, it will be considered the same as a normal allotment and can thus be used in broadening the base for future requirements.

This means that such operators will be entitled to larger normal allotments for future quarters. On the other hand, if conversion steel is bought but not used, it is then counted as part of a manufacturer's inventory.

SCRAP: Tin Can Collection Tried

Scrap drive broadened to include tin cans . . . Test campaigns now underway . . . Time and materials donated . . . Profits go to charity . . . First results encouraging—*By W. V. Packard.*

Need for steel scrap is so desperate that the collection campaign is being extended to include the lowly tin can. Steel industry representatives have decided to find out, once and for all, if tin can collections are feasible. Results of the current limited call for cans will determine whether or not a nationwide drive at household level will be undertaken.

First test city was Hornell, N. Y., where a drive has been underway for about 3 months. Similar campaigns are starting in Elizabeth and Trenton, N. J. Additional cities will be included if present tests prove successful in getting scrap for defense and money for local charity.

For Free—Tin can collection is not economic. The cans can't be gathered and prepared for salvage on a paying basis. So no one gets paid; all time and materials are donated. The call for cans uses two motives: Defense and charity. All money paid for the cans goes to charities designated by local civic leaders.

The huge potential of metal recovery from cans has long been known. It is believed to amount to well over a million tons a year, or about 1 ton per 2000 people per month.

Before cans can be remelted their tin coating must be removed. This is done by special detinning processes. Present annual detinning capacity is about 685,000 tons. This is now being operated at an annual rate of about 500,000 tons, leaving about 175,000 tons excess capacity. In addition to the desperately needed steel scrap, detinning reclaims about 15 lb of valuable tin from each ton of cans.

Avoid Mistakes—Efforts to collect and salvage tin cans during World War II were not very successful. Best year was 1943 with about 175,000 tons of cans collected. Past experience is being studied. Aim is to avoid repeating poorly organized campaigns where collections were uncertain, and cans sometimes became community eyesores.

One big advantage of the current campaign over those of World War II is price. At $40 per gross ton (ceiling) the cans will bring participating charities almost three times as much as could be obtained for them under World War II price ceilings.

Those organizing the test collections are encouraged by early results at Hornell. By the end of the second month collections were at the rate of 1 ton per 2500 people per month, compared to the estimated potential of 1 ton per 2000 people. This means that Hornell's 15,000 citizens are collecting about 6 tons of cans per month. Preparation consists of rinsing, removing label, cutting out ends and flattening.

Year-Round—The Elizabeth and Trenton tests represent an effort to apply the Hornell formula to larger cities. Elizabeth population is 112,000; Trenton, 128,000. First collections will be during the weeks of Feb. 11 and Feb. 18, respectively.

"Want some scrap, bub?"

To be worthwhile, collections will have to be on a continuing, year-round basis. Since scrap is so urgently needed, the steel industry will be glad to get whatever extra can be collected. Sponsors of the tests say success will be measured by whether or not the people donating their time and material are sufficiently encouraged to want to engage in a year-round program.

This encouragement can only come through the satisfaction of patriotic contributions to the defense effort, or substantial funds raised for local charity.

Organizing Tin Can Salvage

(1) Sponsoring organization chooses Tin Can Salvage Program Director who deputizes committee chairmen and maintains close liaison with each.

(2) Publicity chairman sets up press headquarters and puts competent people in charge of press, radio and TV; special materials; women's groups; speakers' staff; and soundtrucks.

(3) Collection chairman picks contact men for commercial, institutional and apartment house salvage.

(4) Storage and transportation chairman should be prominent local scrap dealer who has shipping knowledge and storing and loading facilities.

Tapping of Tin Stockpile Looms

Possibility looms that a "small amount" of tin will have to be withdrawn from the military stockpile to keep production going until existing procurement contracts are delivered.

Tin stocks held in reserve by the

Reconstruction Finance Corp. are running low, and may be exhausted before the end of the first quarter.

Defense Production Administrator Manly Fleischmann said last week that there was no assurance that tin recently acquired from Britain by the steel swap would arrive in time. It was also doubtful, he indicated, that any other contracts for early delivery would give immediate relief. Meanwhile tin users are being put on an even worse spot by the shortage.

New Steel Plant:

May build steel industry in Quebec to use local iron ore supplies.

Construction of a steel industry in Quebec may soon become a reality, according to W. H. Durrell, general manager, Iron Ore Co. of Canada, Ltd. Speaking before the Hamilton branch of the Engineering Institute of Canada recently, he revealed that his company is working with Laval University and the Quebec Dept. of Mines on successful utilization of the iron ore in that province.

He said that the company plans to set aside large reserves of iron ore for use in Canada when Canada shall need it, "We shall look forward to the day when we can supply the steel mills in Hamilton with their requirements. If any financial interests wish to erect steel mills in Canada . . . or if existing plants wish to expand, we shall be glad to ensure them a constant supply of high grade iron ore."

No Market—Mr. Durrell pointed out that for the present there is virtually no Canadian market for Labrador iron ore. Canadian steel mills in 1951 used 4.9 million tons of iron ore, while U. S. mills consumed about 120 million tons.

Manganese Policy Under Study

A re-examination of the Defense Materials Procurement Agency program for buying domestic manganese ores may occur as a result of recent Capitol Hill complaints that the government is "not getting the ores expected."

One anticipated outcome of the re-study is establishment of new receiving depots for the ore.

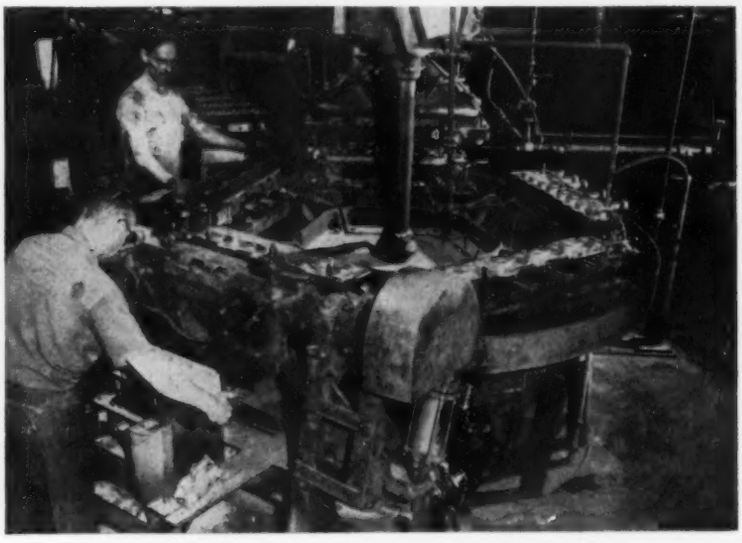
Under a policy developed by Defense Minerals Administration and carried on by its successor, DMPA, the government is buying U. S. manganese at Butte and Philipsburg, Mont., and Deming, N. M.

Rep. Wilbur D. Mills, D., Ark., attracted attention at DMPA and elsewhere by charging that too much reliance is being placed on our continued ability to import desired materials. Seconded by several other congressmen, he urged broadening of the domestic program with a minimum price of $15 per ton for 15 pct ore.

Not Enough—Mills contended that most U. S. manganese deposits have been exploited only partially by elementary methods.

If the country should be involved in a major war while stored quantities of manganese remain tight, Mills maintains, "We would face a desperate situation."

Research



Machine Makes Sand Cores Automatically

A new automatic core-making machine developed by the Osborn Mfg. Co., Cleveland, is boosting production of sand cores for automotive castings as much as 600 pct. Now being used by the Buick Div. of General Motors, the Roto-Core Matic is turning out more than 300 cores per hour.

Roto-Core Matic combines three main operations in core making in one machine. It blows the core, positions core boxes for filling, and extracts the cores from the filled boxes onto dryer plates ready for further processing. Added to the production increase is the advantage of more accurately made cores of higher quality.

Five Stations—Machine consists of a 5-station turntable. First station is for the blow. At the second the dryer plate is placed on the finished core. The core is then taken from the box and placed on a conveyor. Box is next blown and sprayed while at the last station the loose pieces are automatically positioned for the next cycle.

In order to make fast changes for different jobs, core boxes are mounted on removable platens. Air pressure in the blower is maintained at the same pressure of 125 lb per sq in. as in manually operated blowers. Rough treatment of the cores is prevented by an indexer that operates from the station before the blow. Indexer is stopped with no jarring by an oil cushion.

Railroads: Shortchanged on Steel?

Freight car output drops below goal while defense builds up . . . DTA bids for more steel . . . Industry could build 12,000 cars a month . . . Even car rebuilding hurt—*By T. Metaxas.*

The railroad industry's fuming resentment that "government regulation will kill us yet" is finding another outlet—steel procurement through the Controlled Materials Plan. Second and third quarter allocations of steel to build more freight cars, gondolas, locomotives, and maintain rebuilding and repair are considered grossly insufficient by railroad men to meet even minimum requirements.

A goal of 10,000 freight cars and 300 locomotives per month was posted in late 1950. That goal has bogged down. CMP allocations, although providing for 27,000 cars in this year's first quarter, sank to 19,800 for the second, and 16,800 or 5600 cars per month for the third.

Declining freight car production will then just exceed retirement of overage cars, railroad men claim. Car retirement has ranged from 59,000 a year in 1946 to 84,000 in 1949—or from about 5000 to 7000 cars per month. In 1951 the retirement rate averaged about 4185 per month for a total of about 50,000. The '51 below-normal rate is caused by railroads holding on to rolling stock.

Older Cars—Disadvantage of this trend is that average age of freight cars in service grows larger. Defense Transportation Administration recently made a bid to correct the downward rate of car output, pointing out that larger tonnages of bulk raw materials would be shipped in 1952. DTA is bucking opinion of some Washington officials that railroads cried "wolf" before and yet car shortages in 1951 were kept to a negligible minimum.

Although American industry has put on much productive weight in the postwar period, especially under the goal of defense, railroad rolling stock increases have not matched the pace. As of Jan. 1, 1952 there were about 1,753,000 freight cars on the rails. The year 1945 closed with 1,759,662 cars.

Combined facilities of independent car builders and railroad shops could now build a minimum of 12,000 cars per month, THE IRON AGE was told. Even this rate could be expanded.

Second quarter maintenance and repair carbon steel allocations to railroads will total 211,000 tons of steel. Ostensibly this is not too sheer a rejection from the 250,000 tons requested. But railroad men say it fails to recognize that repair, maintenance, and rebuilding work must continue at a gallop to balance out shortcomings of allocations for new cars.

Can't Rebuild—Railroads say they can't get all the new cars they need and are thwarted in rebuilding the old ones by skimpy MRO steel rations. One railroad man gave a hypothetical example: Long-Haul Railroad needs 1000 new cars but when it goes to order it finds that allocations have been already set. Waiting to join the allocations line up takes time and before it can draw a percentage of its request, delivery dates would sprint away to a year's time.

The road's next solution is to rebuild freight cars that otherwise would have been scrapped. Steel to do this would have to come out of its MRO allotment (211,000 tons for the industry). Because MRO just fulfills other maintenance needs, rebuilding must be held in abeyance.

Replacing Rail—To haul more freight with the same equipment means heavier loads and longer freight car teams. More miles are run. Heavier and more frequent use is made of rails—all contributing to accelerated wear. Railroad men estimate that to be safe, 415,000 tons of new replacement rail will be needed for main line tracks per quarter. Only 332,000 tons of rail was allocated in the second quarter. Because modern rail must be heavier than the rail it displaces, "mileage" of the allocation is reduced.

Despite groaning under severity of steel cutbacks (railroad men realize that they have a lot of company in singing the cutback blues) the industry believes that it will adequately meet a normal defense load in 1952. Eruption of war and more frenzied demands on rail transportation, though, could lead to danger.

Financial

Steel Company Earnings—1951 and 1950

Company	Fourth Quarter '51	Fourth Quarter '50	1951 12 Months	1950 12 Months
U. S. Steel	$49,219,645	$36,516,115	$183,953,202	$215,464,142
Bethlehem Steel	39,375,946	32,171,657	106,531,293	122,976,071
Republic Steel	15,695,285	7,410,093	54,921,541	63,794,711
Jones & Laughlin	7,161,000	13,263,000	30,998,000	39,744,000
Youngstown S & T	7,095,122	11,394,492	30,644,201	40,616,403
Inland Steel		5,930,414	34,398,585	38,015,676
Wheeling Steel		4,646,050	17,392,959	18,314,517
Sharon Steel			8,861,187	9,284,643
Colorado Fuel & Iron	1,925,307	2,032,721	3,971,018[4]	4,406,222[3]
Lukens Steel			3,549,567[2]	1,922,037[3]
Alan Wood		928,362	2,303,720	2,546,902
Continental Steel			1,530,372	2,660,153
Keystone Steel & Wire	1,260,404	1,677,652		6,477,387
Kaiser Steel Corp.			5,675,927[1]	4,322,792[2]

(1) 6 months (2) Year ended June 30
(3) Year ended Oct. 27 (4) 6 Mo. ended Dec. 31

National Production Authority Orders

Principal Changes Since Dec. 15, 1951

This supplements the controls digest published in THE IRON AGE, Jan. 3, 1952, pp. 329-341

Order No.	Title and Branch	Issued	Additions—Modifications	Purpose	Related NPA Forms	Branch
M-5	Rated Orders for Aluminum	1-23-52	Revised	Aluminum orders must conform to CMP. Guarantees all CMP aluminum ticket holders positions on mill schedules.		Aluminum & Magnesium Div.
M-6A	Steel Distributors, Earmarked Stocks—Oil Country Goods.	12-28-51	Schedule 2	Prohibits delivery of oil country goods except on ACM orders		
			Direction 1	Sets rules under which warehouses must give preferential treatment to machine tool builders, military, and atomic energy orders. Distributors must accept A, B, C, or Z-2 over other rated orders when order may be filled from stock. Warehouses can replace these items by ordering them from stock.		
M-11	Copper & Copper-Base Alloys	1-23-52	Direction 5	Provides self-certification for distributors of copper foundry and copper powder mill products to replace in inventory goods sold to fill ACM orders.		
M-25	Cans	12-12-51	Direction 2	Orders can manufacturers to fill current orders before carryovers		
		12-29-51	Direction 3	Allows tin can users to adjust bases for first three quarters of 1952 without going to NPA. Revokes and supersedes Dir. 1.		
M-46	Priorities Assistance for the Petroleum & Gas Industries in the United States and Canada.	12-21-51	Revised	Petroleum and gas operators may get priority assistance in obtaining materials. Defines three types of request for CMP aid for oil and gas operators.		Petroleum Admin. for Defense.
M-48	Bismuth	1-15-52	Revised	Removes previous limitations on bismuth. Sets relaxed inventory control system.	NPAF-40(R)	Tin, Lead & Zinc Div.
M-68	Passenger Cars	9-11-51	Revised	Limits use of controlled materials, aluminum castings and forgings, and automatic transmissions in passenger cars.		Motor Vehicle Div.
		12-28-51	Amendment 1	Extends order through first quarter 1952		
M-69	Sulfur	6-1-51		Sulfur shipments must have NPA authorization. Limits sulfur inventories to a 25-day or practical operating level. Permits sulfur use at 90 pct of 1950 consumption levels.	NPAF-98 NPAF-99	Chemical Div.
M-70	Marine MRO Supplies & Minor Capital Additions.	12-28-51	Amendment 1	Extends order through first quarter 1952. Raises cost limit for minor capital additions to $1000.		
M-80	Iron & Steel—Alloying Materials & Alloy Products.	12-17-51	Schedule C	Places specific restrictions on end uses of nickel		
M-88	Aluminum Distributors	1-25-52	Amendment 1	Adds aluminum conductor wire and cable products to controlled materials list in this order.		
M-93	Starting, Lighting, and Ignition Electric Storage Batteries.	12-19-51		Conserves critical materials in production of 6-volt lead-acid electric storage batteries for starting, lighting, and ignition purposes. Prohibits manufacture or rebuilding of certain types of electric		Electrical Equipment Div.

M-88	Aluminum Distributors	1-25-52	Amendment 1	Adds aluminum conductor wire and cable products to controlled materials list in this order.
M-93	Starting, Lighting, and Ignition Electric Storage Batteries.	12-19-51		Conserves critical materials in production of 6-volt lead-acid electric storage batteries for starting, lighting, and ignition purposes. Prohibits manufacture or rebuilding of certain types of electric storage batteries after Feb. 29, 1952. Requires distribution of production between the various types of batteries be preserved in accordance with the existing production pattern.
M-94	Sulfuric Acid	12-29-51		Purpose is to prevent maldistribution of sulfuric acid. Requires producer to offer for sale each month a percentage of his scheduled monthly production of sulfuric acid equal to the percentage thereof which he used in 1950, unless otherwise authorized by NPA.
M-95	Railroad Transportation Equip.	1-4-52		Sets up new reporting procedures for railroad locomotive manuf.
CMP Reg. 1	Basic Rules of the Controlled Materials Plan.	1-5-52	Amendment 1	Permits manufacturers to charge late deliveries of fourth quarter orders against fourth quarter quotas regardless of when delivered.
		1-5-52	Amendment 2	Requires NPA permission to draw upon inventories for higher prod.
		1-5-52	Direction 1, Revised	Permits ACM orders without quotas under specified maximums.

Revoked: Supplements 1, 2, 3 & 4, M-1 Directions 1, 2 & 3, M-5 M-6 Dirs. 2, 3 & 4, M-11 Dir. 1, Revised, M-25 Amend. 1 & Interpretation 1, M-26 Dir. 1, M-47A
Dir. 5, CMP Reg. 1 Dirs. 1, 2 & 3, CMP Reg. 3 Dirs. 3 & 4, CMP Reg. 6

Turn to Page 104

Remember . . . to *forget!*

Remember—a metal working contract placed with Brandt means that you can *forget* the multitude of problems and details that attend complex mass production of unusual defense material . . . or the manufacture of normal consumer items. More and more government and civilian contracts have sought a higher degree of satisfaction in Brandt's extensive and flexible plant facilities, competent engineering and precise workmanship . . . Brandt meets exacting specifications and provides on-the-dot deliveries. Write on company letterhead for your handy file copy of Brandt's complete facilities index . . .

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in all types of metal

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NOTE

This plan is designed as an exchange between steel users (not dealers or brokers). All sales are subject to the applicable CMP and OPS regulations.

Ryerson Will Help You ...SELL STEEL you can't use ...

The Plan In A Nutshell

1. Check your plant for stagnant steel you can't use.
2. Spot all idle and unneeded metal-working machinery.
3. Decide what to sell, and what should be scrapped.
4. Send us a detailed description of the usable items.
5. We will publish your description without cost as a classified advertisement in the Ryerson Pictorial (read by over 100,000 steel users, coast-to-coast).
6. Your ad will be identified by number, and we will promptly forward all replies to you.
7. You make your own deal with the company—or companies—that reply. As we will not be familiar with the quality or condition of the items for sale, we can only serve as the connecting link.

REMEMBER: Your listings must be received by us no later than February 18th as the Ryerson Pictorial goes to press promptly.

...BUY STEEL you need

Plan Also Applies to Metal-Working Machinery and Equipment

Steel is in such short supply today that we have been considering every possible way to make the available tonnage go further. And we have also been looking for ways to get out more scrap so that more steel can be produced.

Yet scattered throughout the country, in thousands of factories and mills, uncounted tons of usable steel, workable machinery and potential scrap are lying idle. This may be due to design changes, a switch from civilian to defense production or other reasons. In any case the problem is how to get the two together—those who want steel and those who have stagnant steel they do not want.

As a service to industry we are opening the pages of our Ryerson Steel Pictorial for just such a national steel exchange.

Here's what we do for you

Your company and any other manufacturer that has stagnant steel stocks or idle metal-working equipment may run a classified ad free of any charge, in our Pictorial newspaper. We are making this offer on a nationwide basis and expect to receive ads from thousands of companies. So in this way you may be able to find steel or equipment you have been searching for.

And since the Pictorial is regularly read by more than 100,000 steel users in every line of business and in every part of the country, there is a good chance that you will also find a buyer for any steel or equipment you send us for listing.

That's why we urge you to meet with your superintendent and storekeeper as soon as possible and—

1. Check your inventories for every lot of steel not marked for use. Check every department for idle metal-working equipment.
2. Decide what you will scrap and what you will try to sell.
3. Send us your classified ad in time to reach us by February 18 at the latest.

In furnishing information for your listings we suggest the following form: *Steel*—Give kind or analysis, shape, length, size, finish, condition (good, fair, poor) and pounds or tons involved. For carbon steel we suggest passing up any item of much less than one ton because of space limitations.

Metal-Working Machinery & Related Equipment

Give kind or type, manufacturer, capacity and condition.

When your ad appears, it will be identified by number only (so your firm name will not be disclosed) and classified by State and by type of steel or equipment. Replies will be forwarded to you promptly.

As you can see, this plan works for the good of everyone but your cooperation is important to its success. Let us have *your* listings of stagnant steel or equipment and we will work with you.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI • CLEVELAND
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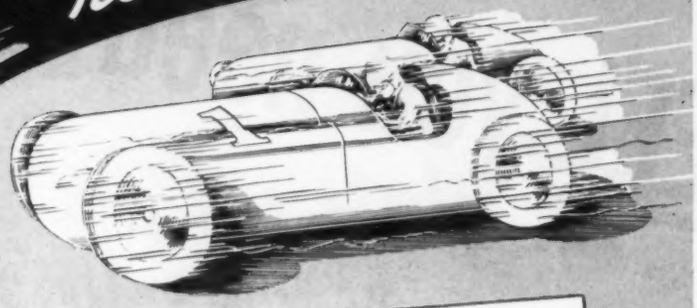

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Here, you'll find specialists in metal-working, skilled in the design and production of component parts, stamped from steel, stainless steel, aluminum and all other metals and alloys.

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SPECIALISTS IN SKILLED STAMPING SERVICE

Controls
Continued

Steel Mill Equipment Classified

Further details on the classification of varied steel mill equipment as "A" products beginning with the second quarter have been made available by the National Production Authority.

Industrial cars together with the necessary ladles or thimbles will be classified as A products when purchased as a unit. However, hot metal ladle cars, slag ladle cars and so on, when purchased separately for replacement purposes, will continue as B products.

Remain "B" Items — Charging and other industrial cars used in and about steel plants will continue as B products under the transportation division.

Charging boxes are controlled materials when produced as steel castings. But they are B products when fabricated.

In order to simplify procurement and processing problems, steel mills are to assign the symbol DO-MRO on purchase orders for bosh plates, stack coolers, tuyeres and similar blast furnace copper castings.

However, in case of new blast furnace construction, the copper castings are to be included on the CMP-4C applications as part of materials and equipment needed.

Controls This Week

Rutile—Placed under inventory control by NPA Reg. 1, Amend. 2.

Scrap—M-20 amended to correlate it with auto wreckers reg. M-92. Restrictions on use of certain electric furnace and foundry grades modified by Amend. 7, CPR 5.

Stainless Steel—Non-nickel-bearing grade de-controlled by Dir. 1, Amend. and Dir. 9, CMP Reg. 1. Placed under inventory controls by NPA Reg 1, Amend. 2.

Steel—Revised M-1 places steel production on either a directive or production schedule basis. Producers must now accept orders on not under 110 pct of production under directives, nor more than 115 pct. Dirs. 1, 2 & 4 revoked.

Try to Fill All Steel Tickets

National Production Authority's planned policy of trying to make good all Controlled Materials Plan tickets now has been extended to include steel as well as copper and aluminum.

Over the week-end, NPA issued a revised M-1, which brings it up to date and formally places controlled steel production on either a directive or production schedule basis.

Directives 1, 2, and 4 were revoked as obsolete and provisions of Dir. 3, relating to order acceptance and lead times for opening mill books, were included in the revised order.

The revised order provides that producers must accept Authorized Controlled Materials orders against not less than 110 pct of production under directives, nor more than 115 pct.

Aluminum Scrap Receipts Limited

Aluminum scrap smelters have been directed to limit monthly receipts during February and March to 110 pct of average shipments during the first 8 months of '50.

Smelters are also directed to reserve a portion of their schedules for orders for deoxidizing ingot needed by steel mills.

The directive, issued by National Production Authority as of Jan. 29, covers aluminum scrap, pig and ingot, primary or secondary, both purchased and toll.

It also provides relief for smelters which were not operating during the base period. Excluded are receipts of primary pig and ingot imported from countries other than Canada.

Sulfur Export Quotas Reduced

Sulfur export quotas for first half 1952 have been confined to 480,000 long tons, all of which is crude except 15,000 tons. This is 25,000 tons less than for the last half 1951.

This represents about 17½ pct of U. S. production, but is in line with distribution proposed by the International Materials Conference.

A regular service of The **COOPER ALLOY** Foundry Co., Hillside, N. J.

TECHNICAL TOPICS

WELDING STAINLESS ALLOYS

Norman S. Mott

Chief Chemist and Metallurgist
The Cooper Alloy Foundry Co.

In the welding of stainless alloys, four types of composition have to be taken into consideration—the hardenable martensitic straight chromium group; the non-hardenable ferritic straight chromium group; the corrosion resisting chromium-nickel group, and the heat resisting chromium-nickel group. These alloy compositions have, in varying degrees, greater thermal expansion and lower thermal conductivity than carbon steels, and in some instances have carbide mannerisms which affect corrosion resistance.

When the torch flame or arc is applied, the metal is heated to a very high temperature only in the area being welded. The heated metal expands and tends to push out in various directions against the colder surrounding metal, producing severe internal stresses. When the heat source is removed, the resultant contraction produces pulling stresses acting between the cooling and the cold metal. If the metal does not have sufficient ductility to stretch and accommodate itself to these great stresses, cracking will result. This is most prevalent in the lower ductility straight chromium grades. By making temperature gradients as gradual as possible, this danger can be minimized.

In the chromium-nickel corrosion resisting alloy types, a form of grain boundary carbide precipitation occurs during welding. To offset the dangers of intergranular corrosion, these carbides must be put into solution by subsequent heat treatment before the welded metal is put into use.

Difficulties which are involved in welding cast stainless steel can be overcome through the use of pre-welding and post-welding thermal treatments as indicated below. Alloys for heat resistance applications usually do not require any thermal treatment after welding.

ALLOY	REMARKS
5%Cr	Preheat to 400°F. or over. After welding, cool to not less than 300°F. then heat to 1650°F. . . . hold for 1 hour, furnace cool to 1350°F., hold for 2 hours, then air cool.
9%Cr	Preheat to 400°F. or over. After welding, cool to not less than 300°F. then heat to 1350°F. . . . hold for 2 hours, then air cool.
12%Cr	Preheat to 400°F. or over. After welding, cool to not less than 300°F. then heat to 1350°F. . . . hold for 4 hours, then air cool.
16%Cr	Preheat to 250-300°F. After welding, cool to 250°F. or lower, then heat to 1450°F. . . . hold for 4 hours, then air cool.
18%Cr	Preheat to 250-300°F. After welding, cool to 150°F. or lower then heat to 1450° F. . . . hold for 4 hours then air cool.
27%Cr	Preheat to 250°F. or over. After welding, heat to 1650°F. . . . hold for 2 hours, then rapidly air cool. If distortion is feared stress-relieve weld for 1 hour at 1350°F. followed by air cooling.
18-8S	Preheat not required. After welding heat at 2000°F. for 1 hour, then water quench.
18-8SCb	Preheat not required, nor is post heat. However, after welding, it may be stress-relieved at 1650°F. for 2 hours followed by air cooling.
18-8SMo	Preheat not required. After welding heat at 2000°F. for 1 hour, then water quench. Sufficient ferritic alloys can often be used without post heating.
FA-20	Preheat to 400°F. After welding cool very slowly then heat to 2000°F. . . . hold for 1 hour and water quench.

Copies of this article reprinted on heavy stock for convenient filing are available on request.

The **COOPER ALLOY** Foundry Co., Hillside, N. J.

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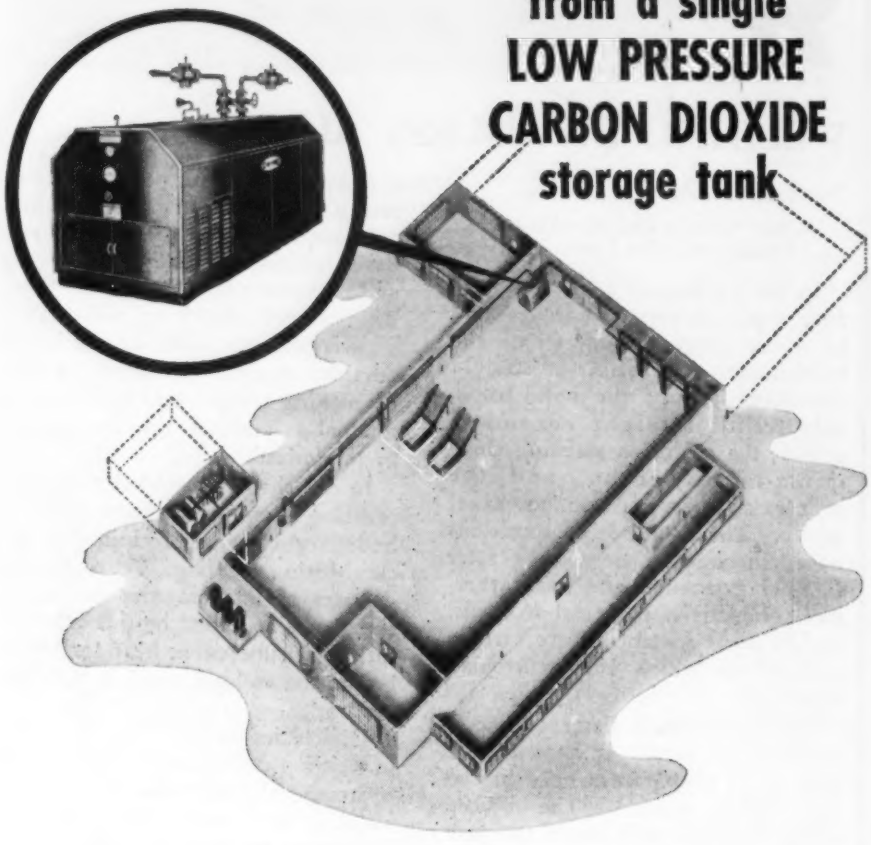

When expanding your plant, you can't afford to wait for additional fire protection ... you need the proper amount at once. However today, material priority regulations slow you up considerably ... these delays hold back vital production and resulting revenue. Install a C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing System in your plant now and new construction to come will be firesafe from the start.

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—Defense Contracts—

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation no. or proposal, and opening date. (Invitations for Bids numbers are followed by "B," requests for proposals or quotations by "Q.")

Chicago Procurement Office, Chicago

Hook, block, crane or crane shovel, 84 ea, B-255Q, Feb. 6.

Hammer, pile driver, drop, 31 ea, B-254Q, Feb. 6.

Hammer, pile driver, drop, 11 ea, B-254Q, Feb. 6.

Naval Shipyard, Portsmouth, N. H.

Box, switch SBM/distribution/brass, circuit with switches, 300 ea, PR-410/52, Feb. 18.

Misc hardware items, 52 item, 52-79, Feb. 18.

Navy Purchasing Office, Washington.

Charger, hydraulic gun, 10,545, 5777A-B, Feb. 27.

Bomb, shackle, 2800, 5805A-B, Feb. 28.

Ordnance Tank Automotive Center, Detroit

Screw, topping, 2,105,899, 521219B, Feb. 19.

Gage, oil pressure assy, 2100, 52-1183B, Feb. 19.

Gage, water temp, 1300, 52-1183B, Feb. 19.

Adapter, tachometer, 1800, 52-1183B, Feb. 19.

Clamp, distr tachometer adapter, 500, 52-1183B, Feb. 19.

Bushing, boom topping pivot, 3350, 52-1165B, Mar. 5.

Gear, idler, winch power take-off, 1500, 52-1165B, Mar. 5.

Bearing, ball, boom pivot, 650, 52-1165B, Mar. 5.

Phosphor bronze bearing, part for 60 MM mortar, 6850, 52-99B, Feb. 25.

Steel nut, part for 60 MM, 7650 ea, 52-99B, Feb. 25.

Steel guide, part for 60 MM, 7350 ea, 52-99B, Feb. 25.

Bronze rammer unloading part for 90 MM gun, 3000 ea, 52-109B, Feb. 26.

Spare parts for shower unit, 40 itm, 782B, Feb. 20.

Bearings, ball and roller pillow blocks var type and sizes, 102,351 ea, 72-20896B, Feb. 25.

Dies, round, 22,565, 5810-B, Feb. 14.

Pliers, diagonal flat nose, 8850, 5812-B, Feb. 14.

Pins, drift barrel type, 5943, 2875-Q, Feb. 15.

Pliers, gas slip joint, 12,800, 5813-B, Feb. 12.

Carpenter equip. 4100 sets, 5794-B, Feb. 25.

Vises, bench and machine, 10,983, 5802-B, Feb. 19.

Grips, forged steel wire rope, 390, 5805-B, Feb. 15.

Chests, kits tool, 69,888, 5823B, Feb. 27.

Jacks, automobile, 1194, 5824-B, Feb. 28.

Strippers, wire, hand, 2675, 5825B, Feb. 27.

Blades, saw, hack, 78082, 5827-B, Feb. 28.

Machines, stencil cutting, 1000, 5829B, Feb. 27.

Braces, bit, 2670, 5830-B, Feb. 28.

Planes, block, 7343, 5831-B, Feb. 28.

Boxes, saw, mitre, 489, 5833-B, Feb. 27.

Brookley Air Force Base, Ala.

Parts for pneumatic hammer, var, (17A-51-2029Q), Feb. 11.

Parts for wrench, var, (17A-51-2029Q), Feb. 11.

Parts for simplate, var, (17A-51-2029Q), Feb. 11.

Parts for wrench, var, (17A-51-2029Q), Feb. 11.

Parts for riveter, var, (17A-51-2029Q), Feb. 11.

Parts for drill, var, (17A-51-2029Q), Feb. 11.

Parts for riveting hammer, var, (17A-51-2029Q), Feb. 11.

Extinguisher, fire, 6010, (ENG-36-109-52-182B), Feb. 4.

Drills, electric, portable, 400, 706B, Feb. 25.

Mandrels, expanding, 50 ea, 706B, Feb. 25.

Ejector, clip, 41,126 ea, 52-144B, Feb. 12.

Spring, clip latch, 681,126 ea, 52-144B, Feb. 12.

Spring, hammer, 558,841 ea, 52-144B, Feb. 12.

Spring, butt plate plunger, 33,510 ea, 52-144B, Feb. 12.

Contracts Reported Last Week

Including description, quantity, dollar value, contractor and address:

Transmitters and units, exceeds $250,000, General Electric Co., Philadelphia.

Regulator assy, 17 ea, $32,944, Pacific Airmotive Corp., Burbank, Calif.

Shock strut assy, exceeds $250,000, The Cleveland Pneumatic Tool Co., Cleveland.

Maintenance parts, exceeds $250,000, Bendix Products Div., Bendix Aviation Corp., South Bend, Ind.

Maintenance parts, 2700 ea, $63,584, Scintilla Magneto Div., Sidney, N. Y.

Plug, 95,725 ea, $117,742, Champion Spark Plug Co., Toledo.

Cabinets, 100 ea, $30,944, Remington Rand, Inc., Philadelphia.

Burner, gasoline lantern, 35,000 ea, $51,872, Rogers Tool & Die Co., Akron, Ohio.

Warmer, dish, steamheated, 395 ea, $78,102, Leonard Haimes Co., New York.

Lamp, operating, major, 48, $41,526, Ohio Chemical and Surgical Equip Co., Madison, Wis.

Table, bedside, cabinet type metal, exceeds $250,000, Walters Mfg. Co., Oakmont, Pa.

Table, bedside, cabinet type, exceeds $250,000, Great Lakes Mfg. Corp., Hammond, Ind.

Lamp, dental, operating, reflector type, exceeds $250,000, Wilmot Castle Co., Rochester, N. Y.

Maintenance parts, 136,420 ea, $77,001, Scintilla Magneto Div., Bendix Aviation Corp., Sidney, N. Y.

Parts, 15,993 ea, $212,016, Douglas Aircraft Co., Inc., Santa Monica, Calif.

Maintenance parts, 17,435 ea, $149,806, Titeflex, Inc., Newark, N. J.

Maintenance parts, var ea, $216,927, Holley Carburetor Co., Detroit.

Wheel assy, 722 ea, $144,111, The Goodyear Tire & Rubber Co., Akron, Ohio.

Main Turbine Throttle and Governor Valve, 1, $39,960, Atwood & Morrill Co., Salem, Mass.

Motor Generators, 192, $113,217, Bogue Elec. Mfg. Co., Paterson, N. J.

Pumps, Steam Reciprocating, 34, $92,079, Warren Steam Pump Co., Inc., Warren, Mass.

Pumps, centrifugal, 2914, exceeds $250,000, Red Jacket Mfg. Co., Davenport, Iowa.

Fire extinguisher, 900, $22,246, Western Associates, Inc., San Carlos, Calif.

Fans, 13,431, exceeds $250,000, Stuart F. Louchheim Co., Philadelphia.

Welding Equip Set, 100, $35,700, S-S Co., Brooklyn.

Generator sets, 72, exceeds $250,000, Detroit Diesel Engine Div., GMC., Detroit.

Filter, water, portable, 600, exceeds $250,000, The Refinite Corp., Ralston, Neb.

Cylinder, ignition, exceeds $250,000, Bayshore Industries, Elkton, Md.

Repair parts for electrical control equip, exceeds $250,000, General Electric Co., Philadelphia.

Repair parts for refrigeration, 10,456, $52,296, York Corp., Philadelphia.

Repair parts for reduction gears, 79, $26,865, Philadelphia Gear Works, Inc., Philadelphia.

Repair parts for landing craft, 170, $25,624, Foote Bros., Gear & Machine Corp., Chicago. Electric Motors & Repair parts, 12,626, $80,004, Star-Kimble Motor Div., Miehle Printing Press & Mfg. Co., Bloomfield, N. J.

Repair parts for diesel engines, 7804, $163,899, The Union Diesel Engine Co., Oakland, Calif.

Valves and repair parts, 23,302, $83,113, Henry Valve Co., Melrose Park, Ill.

Repair parts for gasoline engines, 12,144, $47,006, A.C. Spark Plug Div. GMC, Flint, Mich.

Bearings, 69,990, $137,847, Detroit Aluminum & Brass Corp., Detroit.

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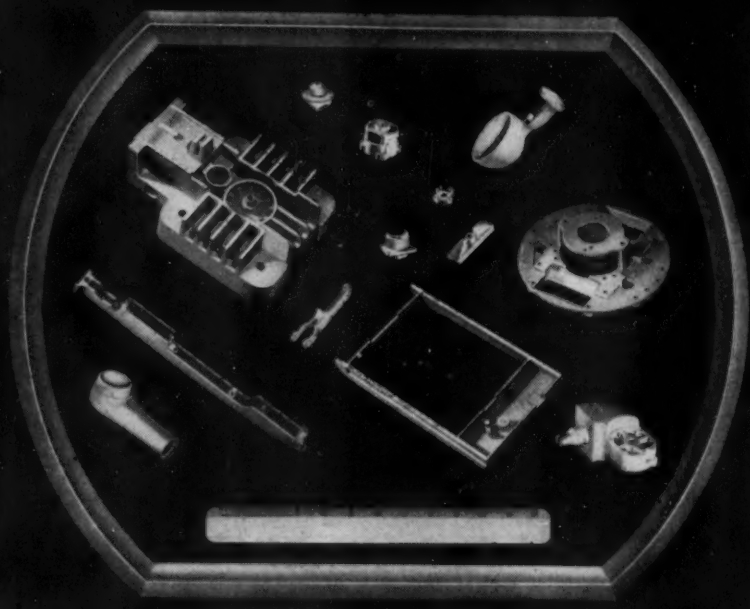

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Structural Shipments in '51

Shipments of fabricated structural steel during 1951, according to reports compiled by the American Institute of Steel Construction, totaled 2,702,262 tons, the largest since 1930, when 2,987,200 tons were reported, and some 426,000 tons greater than the 1950 total. In December 202,679 tons were shipped, somewhat less than the average monthly rate of 225,000 tons for the year.

December bookings were 202,835 tons, the largest month since August, but below the monthly average of 244,000 tons for the year. Total 1951 bookings amounted to 2,931,072 tons and, exclusive of 1950's 3,165,579 tons, it represents the highest annual figure since the 1929 record year for bookings.

The total backlog (bookings scheduled for work ahead) at December 31st amounted to 2,670,202 tons, of which 44% is scheduled for production within the four months following December.

Following is the complete tabulation of bookings and shipments:

	Estimated Total Tonnage for the entire industry		
CONTRACTS CLOSED	1951	1950	Avg. 1947/1950
Total Tonnage			
January	361,373	147,275	161,976
February	256,746	146,695	152,196
March	297,517	236,111	221,387
April	337,026	191,183	177,825
May	268,166	237,476	176,266
June	207,966	333,000	196,725
July	222,540	341,952	229,334
August	212,730	326,586	212,899
September	188,187	317,225	215,870
October	183,921	295,391	223,280
November	192,065*	308,193	194,380
December	202,835	284,492	207,912
Totals	2,931,072	3,165,579	2,370,040
SHIPMENTS			
January	214,000	154,733	166,910
February	193,638	149,824	161,170
March	237,087	185,222	191,297
April	234,095	187,801	192,861
May	234,486	194,752	198,426
June	257,066	202,379	192,851
July	204,380	165,515	183,329
August	236,915	218,435	204,948
September	228,296	198,719	197,321
October	240,056*	211,814	185,785
November	219,564*	193,751	182,249
December	202,679	212,940	199,379
Totals	2,702,262	2,275,885	2,256,536
TONNAGE OF BACKLOG	2,670,202	2,168,712	1,423,620
Percentage scheduled for production within the next four months (To April 30)	44%	46%	51%
After the next four months (From May 1)	56%	54%	49%

*Revised

Steel Inquiries and Awards

Fabricated steel awards this week include the following:

500 Tons, Gonzales, Fla., buildings for E. I. duPont de Nemours & Co., to Belmont Iron Works, Philadelphia.

Fabricated steel inquiries this week include the following:

400 Tons, Hudson County, N. J., New Jersey State Highway Dept., Route 3 Sect. 1-D, bids due Feb. 14.

350 Tons, Pitcairn, Pa., Pennsylvania Railroad diesel repair shop, bids due Feb. 7.

Reinforcing bar awards this week include the following:

700 Tons, Montgomery County, Pa., Pennsylvania Dept. of Highways, Route 769, Sect. 2-C, Conduit & Foundation Co., Philadelphia, general contractors to Bethlehem Steel Co., Bethlehem.

OPS Prepares for Steel Price Rise

Keeps calculations under wraps . . . Some officials reject Putnam's plan for application deadline . . . OPS may halt hold-the-line pricing . . . WSB to split on labor issues —*By G. H. Baker.*

Higher steel prices are now definitely in the offing.

Although the Office of Price Stabilization is continuing to maintain an almost complete air of secrecy in its calculations of increases permitted under the Capehart amendment, it is known that the control agency is now putting the final touches on the formal procedures to be used by steel producers in applying for new prices.

Oppose Deadline — Roger Putnam, the government's top price-wage boss, is known to favor the establishment of a cut-off date for the filing of Capehart applications. Other officials feel that the fixed-deadline procedure would only encourage a wave of price applications that would swamp government price clerks for a period of many weeks.

They'd prefer to see no deadline set and to process the price applications "systematically but rapidly" over a period of weeks.

Drop "Hold-the-Line" — The current thinking at the Office of Price Stabilization is directed toward (1) termination of the present voluntary "hold-the-line" price agreement, (2) the immediate processing of Capehart-amendment applications.

Talk and Doubletalk—OPS officials maintain that they do not yet have "any idea" as to how much steel prices will rise when the Capehart formula is applied to present steelmaking costs. But they definitely intend to restrict the increases to the degree necessary to maintain what they feel is a "proper" cost-price relationship.

Despite all the talk at the Capitol about repealing the "terrible" (President Truman's characterization) Capehart amendment, a spot check shows that there is little chance of this development being approved by the present session of Congress. This being an election year, nearly all opponents of this provision would rather talk about repeal than act decisively on repeal.

"Majority" Rules — Industry members of the Wage Stabilization Board are now on the record as being firmly opposed to proposals calling for union shops or productivity increases, but a survey of labor and public members of the tripartite body reveals only the dimmest chances for the blocking of these proposals.

CIO steelworkers have declared they will not agree to any settlement with steel management that does not include the union security provision. They are demanding a 4 pct productivity increase, but hint that this demand is "flexible."

Clean Split—Industry Member Hiram S. Hall, vice-president, Bigelow Carpet Co., predicts a probable 8-4 division of WSB members when the showdown on these two points takes place.

Adoption of a productivity policy by WSB would only force added costs on those who are not equipped to carry them, in the opinion of Milton Olander, Owens-Illinois Glass Co., another industry member.

"Not Our Fault"—Wage Stabilization Board rejects criticism of its sluggishness in acting upon applications for wage increases. Nathan Feinsinger, WSB chief, says the trouble lies with industry and labor.

As Feinsinger sees it, the delays are due to failure of employers and unions to furnish WSB with comparative industry or area data in support of petitions for increases.

In most of the adjustment petitions submitted to WSB, the requested comparison data is either inadequate or entirely absent, WSB reports.

Exports — Office of International Trade has set Feb. 1 to 29 as the filing period for second quarter export license applications covering non-CMP copper and copper-base alloys.

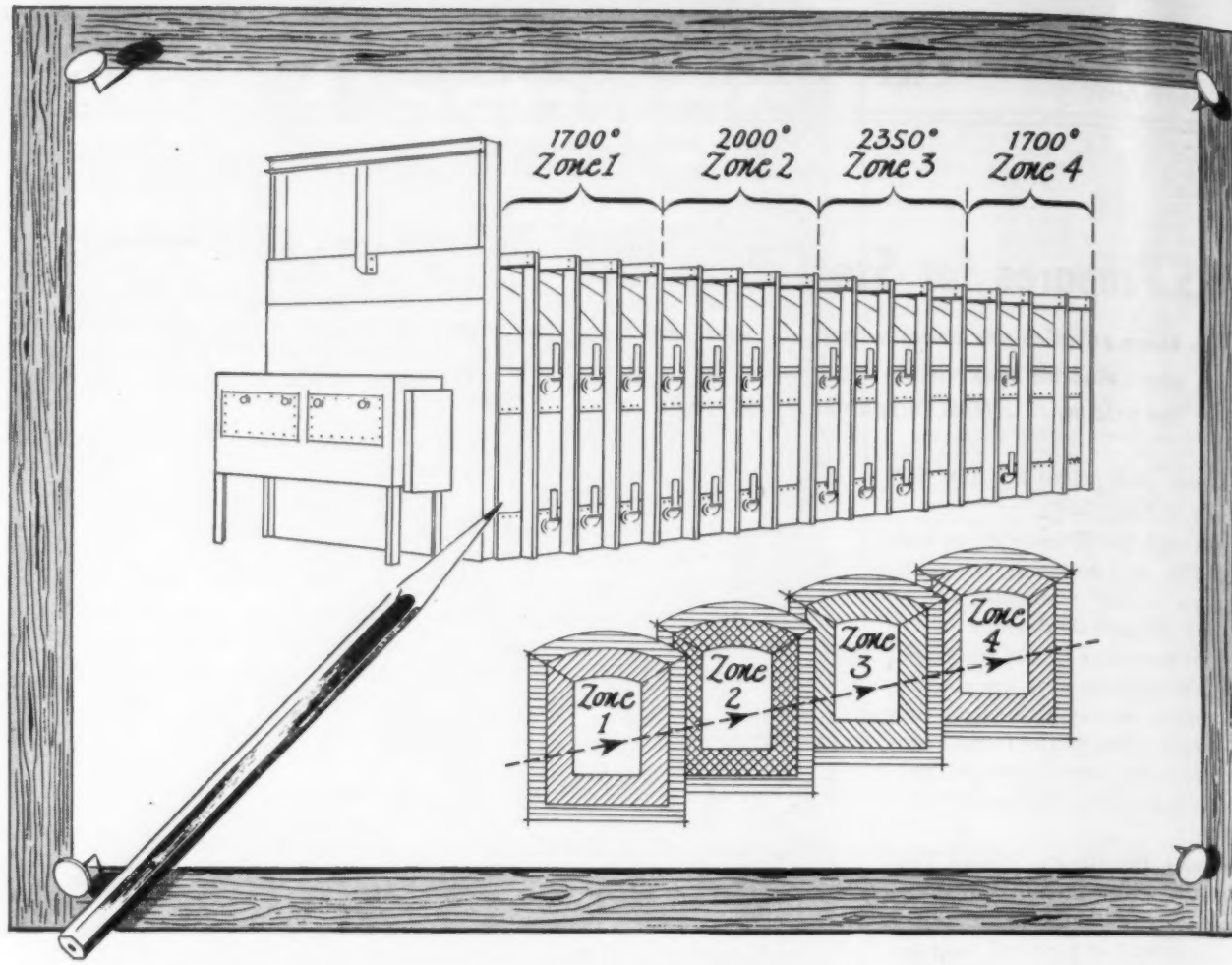
This includes a 2-week extension to enable exporters to receive first quarter licenses and arrange second quarter programs.

Atom War—Fissionable materials are being converted into atomic weapons at a record rate and at the lowest unit costs ever achieved, according to Atomic Energy Commission in its eleventh semi-annual report.

Brass for Safety Pins

Civil Defense Administration must have a 1952 allocation of 71 tons of brass for manufacture of safety pins for use with the new-type burn dressings which have been tested and approved by the armed services, control officials have been told.

Contracts are expected to be let during the year for upwards of 4.75 million dressings which will require about 28.5 million of the special nickel-coated, corrosion-proof brass pins. About 500,000 bandages and the necessary 3 million pins are to be stockpiled immediately.



Which insulating fire brick would you use?

In choosing insulating fire brick, thermal efficiency and cost are always important, but they should not be the only deciding factors. Service conditions to which the brick will be subjected should have just as much influence on proper refractories selection.

Take this continuous furnace, for example. There are four zones, and the furnace lining is exposed to three temperatures in these zones. In the first and last zones, temperatures are 1700° F. In the second zone, the temperature is 2000° F., and in the third, it's 2350° F.

To take full advantage of the differences in both performance and price, four types of Armstrong's Insulating Fire Brick were used. A-20 Brick were specified to withstand direct exposure in both end zones, where temperatures are lowest. For the lining of the intermediate zone, A-23's were used, and in the 2350° zone, where temperatures were most severe, rugged A-26 Brick were specified. To conserve fuel, the linings of all four zones were backed up with efficient A-16 Insulating Fire Brick.

Every brick in the Armstrong Line is formulated not only for top insulating efficiency in its temperature range but also for high resistance to shrinkage and spalling. All are light in weight, yet strong and durable. These qualities, as well as price, will vary with brick types. That's why it will pay you to call in an Armstrong engineer the next time you have the problem of selecting insulating refractories.

By helping you select the right brick for the right place, he can improve furnace performance and perhaps cut your costs. Just telephone the nearest Armstrong office or write to Armstrong Cork Co., 4902 Mulberry St., Lancaster, Pa.

ARMSTRONG'S INSULATING REFRACTORIES

STEEL: More Decontrol Expected

Establishment of study group seen as tip-off . . . Some inventories over limits . . . Mills have trouble selling some items . . . Structurals gap is narrowing—*By A. K. Rannells.*

Indications continue to point this week to spot removal or at least substantial relaxation of controls over varied steel products.

Clear current sign is the go-ahead signal given by National Production Authority to its steel products advisory committee on a proposal to set up a task group to study and make recommendations on decontrols.

This action was taken at a meeting last week when industry spokesmen laid their cards on the table. Inventories of some products are spilling over the permitted limits, they pointed out. Also, they said, mills are having difficulty in disposing of certain products.

Hard to Sell—These include secondary tin mill products, cold-rolled sheet and strip, and merchant pipe and mechanical tubing. Some wire products were reported as being in fairly easy supply.

This is the second move in indicating good faith of the heads of the Defense Production Administration and NPA who have constantly declared that controls will be removed as soon as possible.

First step was taken recently when straight chrome stainless controls were lifted for all practical purposes.

Switch Output—The industry group also recommended that DPA and NPA begin now to plan for diversion of plate and structural production facilities to other types. For example, there is now a backlog of 6 months or more for some kinds of pipe.

Controls Chief Manly Fleischmann said last week that the structural steel situation is still "very tight." But close observers note that on the basis of submitted requirements, the margin between supply and demand is narrowing.

Figures reported by NPA show that second quarter requirements were about 170 pct of supply as against a demand of about 205 pct for fourth quarter 1951—a considerable drop in the ratio.

Some Needs Filled—Industry spokesmen point out that demand is deceptive, that structurals and sheets output chew up ingots at a faster rate than other types. Some requirements for major shapes are already filled, and await only minor products to cause the roof to fall in almost overnight, one source told THE IRON AGE.

On this basis, the industry would not be surprised to see supply and demand for structurals come nearer balance by the end of the year. The recommendation is that NPA begin rechanneling production before the two meet.

Furthermore, it is recommended that the control agencies work out some method of encouraging more construction planning. Industry believes that designing and planning are at a virtual standstill because the construction industry has been led to believe in a long term shortage of materials.

In addition to making decontrol recommendations, the committee has agreed to work out plans in cooperation with the Office of International Trade and the Mutual Security Agency (formerly ECA) for increasing exports of steel products as they come into balance in this country.

Domestic demand will not be sufficient to take up full production of planned facilities for many products, it was said.

"Joe sent me. Got any steel?"

AEC Pays $250,000 Ore Bonuses

Atomic Energy Commission paid out more than $250,000 in bonuses to uranium ore producers last year. Payments have stepped up output considerably. One-third of the mines certified for bonuses had no production prior to March 7, 1951.

Graduated bonuses are based on uranium oxide content of the ore. They are offered to new producers and certain existing producers on that part of the first 10,000 lb of uranium oxide in acceptable ore delivered between March 1, 1951, and Feb. 28, 1954. Money is paid directly to producers in addition to established prices paid by processing plants and purchasing stations.

Deal for African Copper, Lead

Mutual Security Agency has agreed to advance $1,640,000 to Uruwira Minerals, Ltd., to be used in purchasing American mining equipment and services in developing its Mpanda mine in Tanganyika.

Entire amount of the loan, plus 5 pct interest, will be repaid in the form of lead and copper for stockpiling. Shipment is to begin by Jan. 1, 1954, and completed by Dec. 31, 1956.

Also, the U. S. is given the option of buying up to one-half of Mpanda production for a period of 10 years after repayment of the advance is completed.

Industrial Briefs

Color Motion Picture—"Steel With a Thousand Qualities," believed to be the only color motion picture devoted entirely to the manufacture of steel castings, sponsored by the LEBANON STEEL FOUNDRY, Lebanon, Pa., is attracting attention throughout the foundry industry. The film's theme, based on a tour of Lebanon's facilities, is being distributed directly by the company.

Recent Purchase—The Tractor Div. of ALLIS - CHALMERS MANUFACTURING CO., has purchased 12 acres of land located at Knowland Road and 35th St., Independence, Mo. Plans for immediate construction of a new and modern factory branch to serve agricultural and industrial dealers have been made.

Golden Anniversary—One of the oldest members of the ball and roller bearing industry, NICE BALL BEARING CO., Philadelphia, celebrates its Golden Anniversary this year. A program of almost continuous growth and expansion has resulted since the war, so that now well over a million bearings are produced each month.

New Storage System — AMERICAN CYANAMID CO., New York, has installed a new storage system, which includes a rotary stacker conveyor and underground tunnels for blending, at its plant in Brewster, Fla. More accurate blending and more efficient operation is claimed.

Makes Move — KURT ORBAN CO., INC., American distributor for Stahlunion Export GMBH, Germany's leading steel exporters, has moved to 205 E. 42nd St., New York.

Full Employment — JOSEPH T. RYERSON & SON, INC., is offering to help manufacturers get steel and equipment they need, and to sell what they don't need. The main selling aid is free advertising in their pictorial newspaper, circulation 100,000.

More Space — NATIONAL BROACH & MACHINE CO., Detroit, has added 24,000 sq ft of floor space for executive offices, engineering operations and manufacturing facilities in its new building at 5600 St. Jean Ave.

Regional Office Opened — MINNESOTA MINING & MANUFACTURING CO., Atlanta, Ga., has opened a new regional sales office and warehouse at 732 Ashby St.. NW.

Distributorship Award—INDUSTRIAL SYSTEMS CO., New Brunswick, N. J. has been appointed as exclusive distributors for Industrial Washing Machine Corp. The move consolidates the manufacturer's sales activities and makes the company sole sales agents on both the national and international levels.

Public Service Award—Robert F. Nelson, vice-president in charge of engineering, manufacturing, personnel and operations, of the AMERICAN TYPE FOUNDERS, INC., has been awarded the Navy Distinguished Public Service Award for his contributions to the World War II shipbuilding program.

Larger Quarters—The Pratt & Whitney Div., NILES - BEMENT - POND CO., has occupied larger quarters at 683 Lincoln Ave., Pittsburgh.

Acquisition—A new plant, providing 30,000 additional sq ft of floor space, has been acquired by GIDDINGS & LEWIS MACHINE TOOL CO., Fon du Lac, Wis., to house its Davis Boring Tool Div.

. . . "Got a knack for gettin' right to the root of the trouble . . ."

Sells Sander Line—PORTER-CABLE MACHINE CO., Syracuse, N. Y., has sold its floor sanding machine line to Clarke Sanding Machine Co. This transaction will enable Porter-Cable to devote more time to the engineering and distribution of portable electric tools.

Distributors Appointed — George W. Cassady Co., Williamsport, Pa.; Davenport Engineering Co., Davenport, Iowa; and Monogram Air & Power Equipment, Inc., New Haven, Conn., have been appointed distributors for the Cleco Div., REED ROLLER BIT CO., Houston.

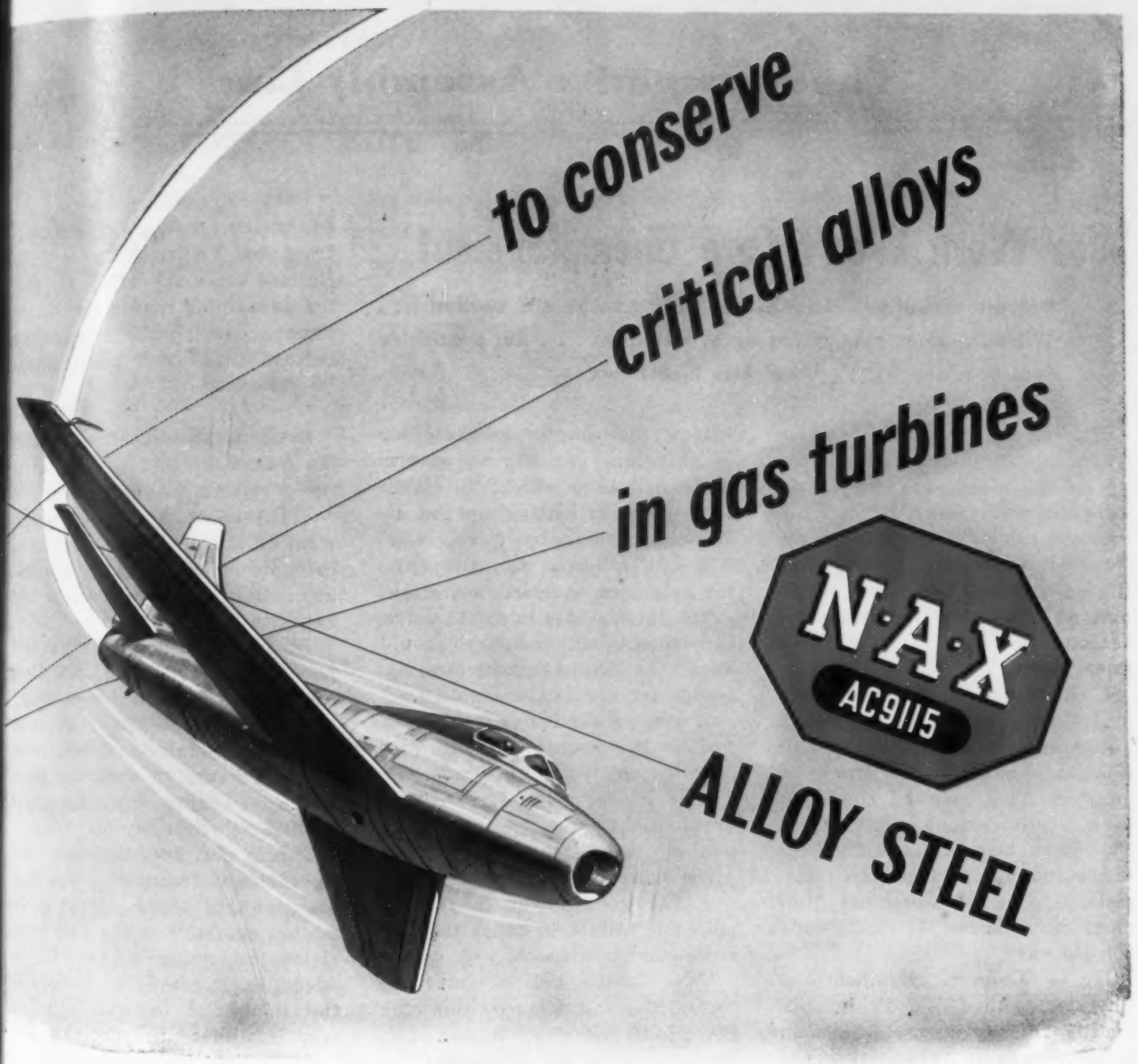
Merchandising Plan — HOTPOINT, INC., Chicago, has adopted a plan under which more than one million prospective customers each year will be shown complete motion picture appliance demonstrations outside dealers' stores at a cost of about 3 cents per prospect.

New Facilities—Construction of new graphitizing facilities which will greatly increase the production of graphite electrodes at the Niagara Falls plant of INTERNATIONAL GRAPHITE & ELECTRODE CORP. is being undertaken to meet the increasing demand of the electric steel and chemical industries. It is expected to be in full production by May, 1953.

Assets Purchased—Certain assets of the Chicago operation of Cummins Diesel Sales Corp., have been purchased by Raymond H. Snyder, who will operate the facilities as an independently owned Cummins dealership, with the new name of CUMMINS ILLINOIS ENGINE SALES, INC.

Important Development—A new high-speed panel machine is now setting new records at THE AMERICAN BOX CO., Cleveland. The new machine is already producing for rush defense contracts at double the speed of conventional machines.

Furnace Delivered—The Toledo plant of SURFACE COMBUSTION CORP., has delivered the longest standard heat treat furnace ever built, to Whitehall Precision Castings Div., of Michigan Steel Castings Co., Whitehall, Mich.



N-A-X AC9115 ALLOY STEEL offers a means of reducing the use of critical alloy steels of the "stainless" type in gas turbine and similar applications. In specific cases it has replaced over half the amount of strategic material originally required, with no sacrifice of quality.

N-A-X AC9115 ALLOY STEEL has high strength and toughness values at temperatures ranging from −70° F. to +1,000° F. It can be readily cold formed into the most difficult shapes; its response to welding by any process is excellent. It must, however, be suitably coated for protection against cold or hot corrosion.

Investigate the outstanding properties and characteristics of N-A-X AC9115 ALLOY STEEL and, through its use, conserve the critical material so necessary to our nation.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division • Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

War Work Won't Cure Unemployment

Detroit executives insist larger auto quotas are needed . . . Wilson blames everything on Washington . . . Raps machine tool bottleneck . . . UAW hits Eisenhower—*By W. G. Patton.*

Placing additional defense contracts in auto plants will not take up enough slack caused by civilian cutbacks to solve Detroit's unemployment problem leading automobile executives bluntly told the government task force which arrived here last week to study the reasons why Detroit has 105,000 unemployed.

C. E. Wilson, president of General Motors, called for a boost in auto and truck schedules to 1 million cars and 273,000 trucks a quarter. This may be compared with a government allotment of 930,000 cars and 220,000 trucks—if the industry can get the materials. Copper and aluminum allotment is sufficient to build only 800,000 cars.

L. L. Colbert, president of Chrysler, joined Wilson in predicting further unemployment in Detroit as well as a severe car shortage next spring if automobile quotas are not increased.

Whodunnit?—Who is responsible for Detroit's unemployment dilemma? C. E. Wilson, GM head, places the blame squarely on Washington, pointing to several major mistakes which, he claims were made in setting up the defense program:

1. The military was not given top priorities on scarce materials. After setting this material aside, Wilson argued, industry should have been told to seek its own materials for civilian production.

2. The auto industry was classified as nonessential—along with hairpins and venetian blinds.

3. If it was necessary to "discriminate" against the auto companies, they should have been given more defense work.

4. The government is responsible for failure to break the machine tool bottleneck.

"We finally got a (machine tool) order and now we think it is going to be canceled," Wilson said. He was referring, of course, to the recent suspension of the Fisher Body contract to build Bullard machines.

Cancel Contract— While announcement of deferment of the $60 million machine tool subcontract by Fisher Body to build Bullard machines was a surprise, the underlying reasons behind the announcement make it reasonably certain the Fisher contract will be cancelled.

Background—Here are some of the conditions that contributed to the government announcement:

(1) A lot of Washington people went off half-cocked attempting to estimate machine tool requirements and available machine tool capacity.

(2) New machine tools that will perform the same job as a Bullard are constantly being developed.

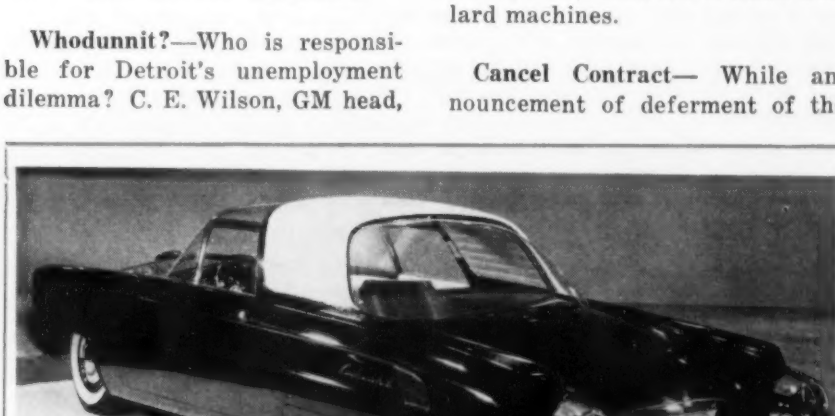
(3) There have been changes in aircraft schedules that will make it unnecessary to complete these Bullard machines my midsummer of 1952 as originally planned.

This is one more illustration of the difficulty facing any Washington planning board. If the information available at the time a decision is made proves to be adequate, subsequent changes in the industrial or war situation may invalidate the decision.

All indications point to further progress in the race to tool up for new V-8 engines. Deliveries are being stepped up to meet the Feb. 1 deadline. Where it is impossible to comply with this regulation, permission has been obtained in some cases to ship as late as Mar. 15. Additional extensions will be made to permit completion of this tooling.

Don't Like Ike—The UAW-CIO's anticipated opposition to Eisenhower as a candidate for President was expressed this week by secretary-treasurer Emil Mazey, who characterized Ike as "part of this vicious dictatorial caste system" of the Army.

"I have carefully examined the record of Gen. Eisenhower and I want to say that I find nothing in his record which would indicate that he is acceptable."



CAR TO COME: This pilot model is being studied by Ford Motor Co. engineers for future development as a 4-passenger sedan. Called the Continental 195X, it has a height of 56.7 in. and a length of 220 in.

STEERING: Power Race Starting

GM and Chrysler each pushing own system . . . Basic concepts quite different . . . GM expects production to reach 1000 per day by August . . . Other companies are reported interested.

The strong competition in the automobile industry was never better illustrated than by the power steering race that is developing between General Motors and Chrysler. Complete technical details of the new GM device built by Saginaw Steering Gear Div. were given at a meeting of the Mid-Michigan Section, Society of Automotive Engineers at Saginaw last week.

Competition often develops in the industry where two different devices are built to do the same job. Hydra-Matic vs. Dynaflow is an example.

In the case of power steering, the devices that do the job for GM and Chrysler are nearly identical. However, the basic concept behind the two designs is quite different.

In the Saginaw power steering gear, the steering mechanism remains unchanged. The driver must always exert 3 lb pressure on the steering wheel before the power booster comes in. The gear ratio is unchanged. The driver has the same "feel of the road" as in conventional driving. Spring-back of the wheel after turning a corner is identical with standard designs.

In the Chrysler design, the steering gear ratio has been reduced to 16 to 1. The feel of the road is not so pronounced as in the GM design.

Well Received—The enthusiasm automobile engineers have for power steering is unmistakable. At a press conference last week, W. H. Doerfner, general manager of Saginaw Steering Gear disclosed that current production is 250 units per day. This will soon be boosted to 500 per day. The company expects to reach 1000 units per day by August.

Deliveries of power steering units are divided among GM divisions at the rate of 3000 Cadillac, 1600 Buick and 1400 Olds per month. It was recently disclosed that Lincoln and Packard are seriously interested in power steering. Another potential customer is Yellow Coach & Truck.

An interesting feature of the Saginaw steering device is its flexibility. Minor changes have to be made in brackets, positioning of the power cylinder and other features to adapt it to different lines of cars. These changes are readily made.

Coming Thing — Doerfner of Saginaw Steering Gear feels Cadillac alone could sell 60,000 power steering devices per year. He expects the device will be adapted by all higher priced cars and power steering will eventually filter down to the lower price field. Trucks and buses look like sure-fire customers for the future, he believes.

No critical materials are involved. The only thing lacking to give power steering a big push is the machine tools required for production, according to Doerfner.

"IMC Is Copper Trust"

Sen. Homer Ferguson told the Senate that an "international copper trust" is responsible for the layoffs in the auto industry. The trust "prevents acquisition of 3000 tons of copper in the world market—the amount needed in the second quarter to prevent" further layoffs of automotive workers. The International Materials Conference is the copper trust and also is a raw materials trust, the Senator charged.

Foreign countries are using American money to buy foreign copper at prices up to 50¢ per lb, double the U. S. controlled price, the Senator said.

THE BULL OF THE WOODS — By J. R. Williams

I SAVE ALL THE OLD GLOVES I FIND AROUND TH' SHOP JUST FER THIS PURPOSE -- THEY KEEP GREASE AND OIL OFF TH' BANDAGE!
NICE, CLEAN THINKIN', PAP -- YOU SURE LOOK AFTER US, DON'T YOU, PAP?
2-8
J.R.WILLIAMS
BORN THIRTY YEARS TOO SOON
T. M. Reg. U. S. Pat. Off.
Copr. 1952 by NEA Service, Inc.

PROGRESS REPORT ON NATIONAL CARBON
TRADE-MARK
BLAST FURNACE LININGS

33 BLAST FURNACES lined with "NATIONAL" carbon have now produced over 1 million tons. Of these, 12 furnaces have produced more than 1½ million tons and 4 have passed the 2 million ton mark.

These tonnages are for *original linings*. In every case, production has been characterized by remarkably trouble-free operation.

The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
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District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
In Canada: National Carbon Limited, Montreal, Toronto, Winnipeg

OTHER NATIONAL CARBON PRODUCTS

BLAST FURNACE LININGS • BRICK • CINDER NOTCH LINERS • CINDER NOTCH PLUGS • SKIMMER BLOCKS • SPLASH PLATES • RUNOUT TROUGH LINERS • MOLD PLUGS • TANK HEATERS

Wreckers Knock NPA Jalopy Order

Complain M-92 is impracticable . . . Some just can't ship as ordered . . . If they don't buy abandoned cars, who will? . . . NPA delays don't leave enough time—*By R. T. Reinhardt.*

This column has revealed that response to National Production Authority order M-92 by auto wreckers in California has been far less than government officials anticipated. (THE IRON AGE, Jan. 31, 1952, p. 85.)

A heated, though not belligerent nor unsympathetic group of 200 auto wreckers from northern California last week made clear in part at least why they have been slow to comply.

Charles Martin, salvage head for the San Francisco regional office of NPA, was bombarded with questions and denunciations of and about the order and its practicability. Wreckers from snowbound and flooded areas, and remote areas from which it was uneconomic to ship scrap bodies as directed, wanted to know what to do.

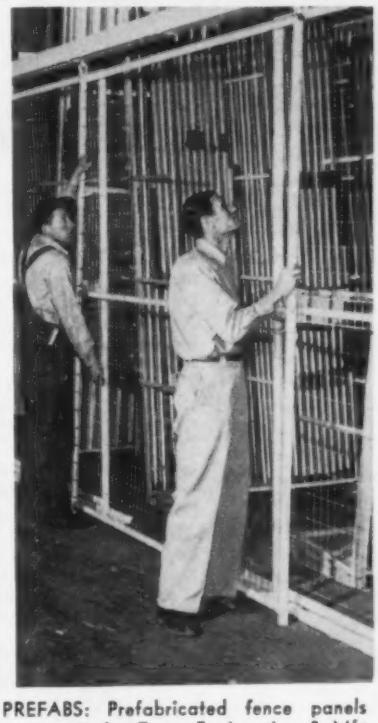
Leave 'Em Lay?—Wreckers who found themselves heavily stocked with cars beyond their physical means of wrecking within the limited time specified in the order wanted a way out. Wreckers with prospects, the desire, and under compulsion to purchase large numbers of jalopies for which licenses and taxes would not be paid in 1952 asked if such junk was not to be purchased as such but left on the highways or abandoned behind barns.

Spokesmen for the wreckers repeatedly emphasized that while theoretically M-92 speaks of a 90-day period, actually, because of delays in getting the order into wreckers' hands, they had only about 60 days to clean out their inventories in the first quarter.

Not Long Enough—Obviously, they were more confused about Section 4 pertaining to limitations on acceptance of motor vehicles and car units than any other phase of the order. On one point there was unanimity of thought: "A 90-day limitation of inventory clean-out of pre-1946 cars just won't work."

Interviews with wreckers after the meeting made it clear that NPA will soon be flooded with "requests for adjustment or exception" under Section 6 of the M-92 order. It appears that these exceptions in most instances will be granted in the interests of furthering the primary purpose of the order—get out the scrap.

Give and Take—Robert Warner, salvage chief of Defense Production Administration, last week in San Francisco gave some assurances to western steel producers and users and also learned some of their problems.



PREFABS: Prefabricated fence panels cut costs for Texas Engineering & Mfg. Co., Dallas. Panels can be erected without nailing or welding.

He corroborated Manly Fleischmann's recent implication that there was little chance of western scrap moving East even though at present western mills were in better inventory position. Mr. Warner optimistically expects the auto wrecking program in the West to produce more scrap percentage-wise than any other section of the country with the possible exception of New England.

He made it quite clear that the Federal Government would not enter into "deals" with city officials anxious to acquire new steel in return for scrap of any kind even though it was sorely needed for schools and other municipal structures. He lamented the fact that there are approximately one million tons of abandoned street car rails still in the ground with but little hope of their recovery as scrap. He emphasized that even though Office of Price Stabilization would, on appeal, establish a selling price above ceiling, the cost of recovery was usually so high that scrap buyers couldn't afford to buy it.

Mostly Listening—In Seattle Mr. Warner sat still to hear what members of the scrap mobilization committee had to gripe about.

Among other things he was told that strong policing as well as an educational program was needed on the West Coast to bring about production of bundles clean enough for economical use. With many new baling presses getting to work on increasing amounts of auto scrap, closer supervision is essential if furnaces are to use the maximum of this type of charge. In the Northwest, furnaces can handle only from 10 to 20 pct of bundles in their charge. They would like to use as much as 40 pct.

FACTS TELL THE STORY...

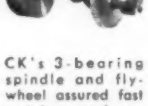
NEW KEARNEY & TRECKER MILWAUKEE CK MILLING MACHINE CUTS PRODUCTION TIME 75%

C-K MILLING MACHINE FEATURES THAT HELP DO THIS JOB BETTER

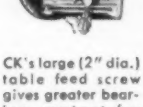
New CK column easily absorbed vibration from heavy cutting load.

Greater horsepower permitted maximum results from modern cutter.

24 different spindle speeds (13 to 1300 rpm) plus 32 different table feeds (⅜" to 90" ipm) meant operator selected proper combination to take full advantage of high horsepower and modern tools.



CK's 3-bearing spindle and flywheel assured fast metal removal, excellent finish.



CK's large (2" dia.) table feed screw gives greater bearing contact for smoother feed.

CK's positive, metered lubrication assures trouble-free operation.

The FACTS on this job are:

Operation: Face mill four sides
Workpiece: Ram for slotting attachment
Material: S.A.E. 4615 forging — 2¼" x 2¾" x 18½"
Machine: New 25hp No. 4 CK vertical
Cutter: 6" dia., 8 Tooth Carbide Face Mill with 7° negative primary rake angle.
Cutter Speed: 275 rpm **Depth of Cut:** ¼"
Table Feed: 25 ipm **Machining Time:** 3.8 minutes
Total Saving in actual machining time: 11.9 minutes or 75.8%

NOTE: Part machined is the operating ram used in a slotting attachment. It must be tough and accurate. It is milled to a semifinish state and finish ground to final accuracy.

It will pay you to see the new CK line of milling machines — check them against your own requirements. You'll notice how every feature is designed and job-proven to give you cost-cutting results — greater machine capacity, productivity and better finished products. So, for the full story, contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

Why Bullard Lathes Were Held Up

Contract to GM's Fisher Body not cancelled—merely delayed . . . Design, engineering, jet scheduling changes call for restudy . . . Fisher Body won't lose on deal—*By G. Elwers.*

The Fisher Body contract to build Bullard vertical turret lathes has not been cancelled, just held up. Since the large volume of orders for Bullards of last year, the situation has changed. Changes in design, in engineering, and in scheduling of the jet engine program have been made.

In the light of these changes the Munitions Board is reviewing the need for so many Bullards, and may announce a decision soon after this is printed.

Plan Other Work—Fisher won't lose its contract to build machine tools, says the Defense Production Administration. If it is found that Fisher's facilities aren't needed to turn out Bullards, they'll be used for production of some other type of machine tools.

An attempt will be made to select a type which fits in as much as possible with the tooling Fisher Body has already installed for Bullard production.

Reimbursement—In any event, GM's Fisher won't lose out. It has a GSA pool order which guarantees reimbursement for money invested in tooling on orders certified by GSA.

Shifts and changes in tooling requirements are constantly going on, though few are as spectacular as this drop in need for Bullards may prove to be. Overestimation of needs for machine tools is one cause. Production rate and engineering changes also have their effect.

Change in Process—Recently a machine tool builder told THE IRON AGE he had a contract for a big special transfer machine cancelled. It was intended for machining an aircraft engine part. Checking up in Washington, IRON AGE found no change in production schedules for this engine.

What had happened was a decision to make the part in question by the Croning casting process, which greatly reduced the required machining.

Prefer Standard—The relative roles of standard and single-purpose machine tools in defense tooling-up is a controversial one. Many contractors seem to want to use standard tools wherever possible, apparently in hopes they'll have equipment useful in civilian production after the emergency is over. Others feel the emergency will last long enough so the tools will be too worn and outdated for efficient civilian use.

Some who favor use of single-purpose tools where possible feel insistence on standard tools is unnecessarily inflating backlogs.

Profitable Ingenuity—Here's an example of the sort of thing they cite: One war plant wanted to order 28 of a large multi-purpose type of machine tool to handle a certain production job. But after looking at the long delivery time and being told not to expect enough diversions, this plant's production engineers did a little soul-searching and decided to have special machines built, instead.

The special machines they ordered will be delivered months sooner. Only six machines will be required to do the job which would have required 28 of the others. They will require only ¼ as many operators and ⅓ the floor space. And they'll total only half the cost.

Japanese Tools?—A three-man technical mission is being sent to Japan to look over that country's machine tool industry. The objective, says the NPA, is to find additional productive capacity.

Japan's 30 machine tool builders are not operating at capacity. The mission will see if they can build the types, sizes and quality of tools the U. S. needs.

Tools from Schools—The Federal Security Administration is going to play Indian giver on the machine tools it gave to colleges, vocational, and other schools after the last war. A preliminary recovery program has already resulted in getting 180 machine tools worth $1.2 million.

The program in full swing is expected to repossess several thousand machine tools. Nobody knows just how many such machine tools there are in schools around the country. But the government feels there are enough to make a recovery program worthwhile.

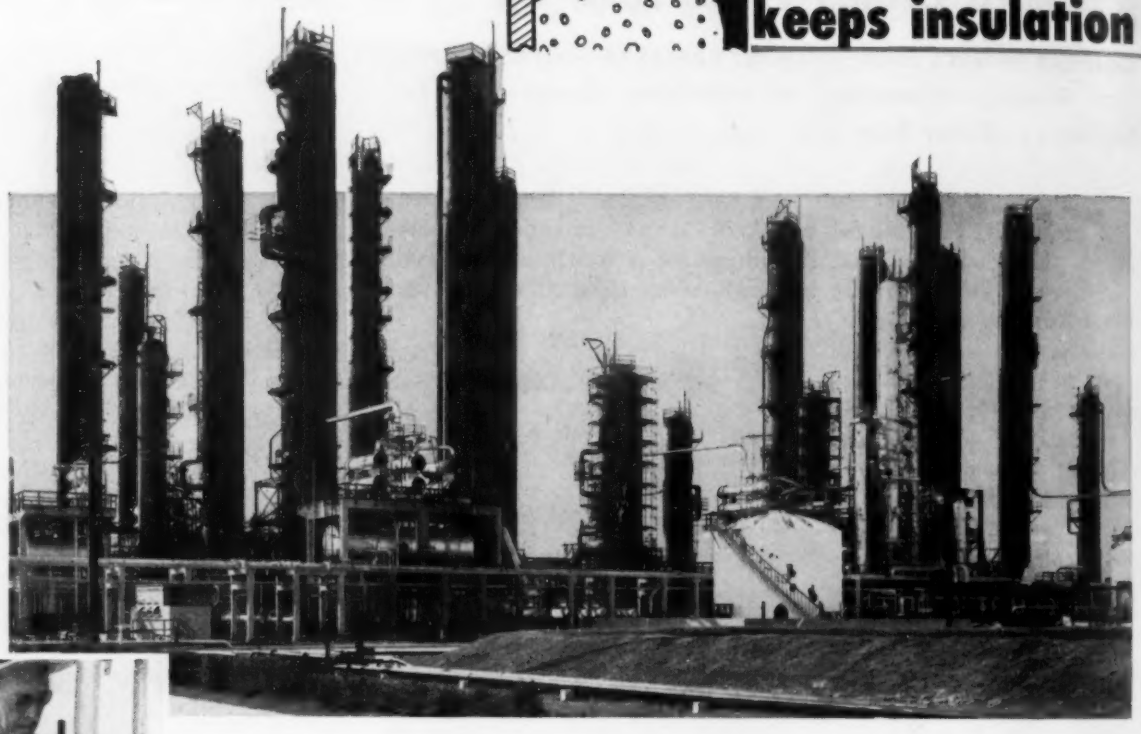
Biggest Tool Contract

General Services Administration has completed a contract with Cincinnati Milling & Grinding Machines Co. by which the firm will produce 9576 machine tools for $165,361,020.

Administrator Jess Larson said this was believed to be the biggest machine tool contract in history and brings the total in pool orders past the $1 billion figure.

Larson said that out of 127 pool offers set up by GSA — involving production of nearly 75,000 tools — manufacturers had accepted 79 pool orders valued at $855,073,127.

INSUL-MASTIC vapor barrier keeps insulation dry



Here's what happens when insulation is improperly coated. This became water-soaked. The resultant rust still clings to it.

Inadequately weatherproofed insulation leads to trouble . . . trouble that can be averted by Insul-Mastic Coatings.

In more and more industrial plants, engineers are replacing their watersoaked insulation . . . using non-absorbent Insul-Mastic Type "D" . . . and in places where more insulation is required, new, dry conventional insulation is being protected with Insul-Mastic vaporseal and glass membrane.

Recently in a large plant the steel shells of huge fractionation towers were very badly rusted and pitted because of water-soaked insulation. An inferior coating over the insulation had permitted moisture and rain to penetrate. To prevent further damage to the shells, the insulation had to be removed.

Where temperatures did not exceed 225° F., Insul-Mastic Type "D", the spray applied cork filled, non-absorbent insulation, was applied. Where temperatures exceeded this figure, standard thermal insulation was applied and sealed with Insul-Mastic vapor-seal and glass membrane.

Engineers are preventing this situation from occurring in their plants by specifying Insul-Mastic high quality, homogenized Coatings, when working out the plans for the insulation and protection of new units and equipment.

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The Iron Age

SALUTES

Col. James S. Ervin

His salesmanship and executive abilities have served both his company and his countrymen well.

"EXPERIENCE FOR SALE," was the theme of a Mackintosh-Hemphill Co. ad campaign in the early thirties. This theme was characteristic of Sid Ervin, then new president of the rolling mill manufacturing company.

Sid came to the 150-year-old company in 1932 as a management consultant. A few weeks later he was elected president. Instead of cleaning house, he gave his key executives complete freedom to be successful. Sparked by his leadership, both the company and its executives prospered.

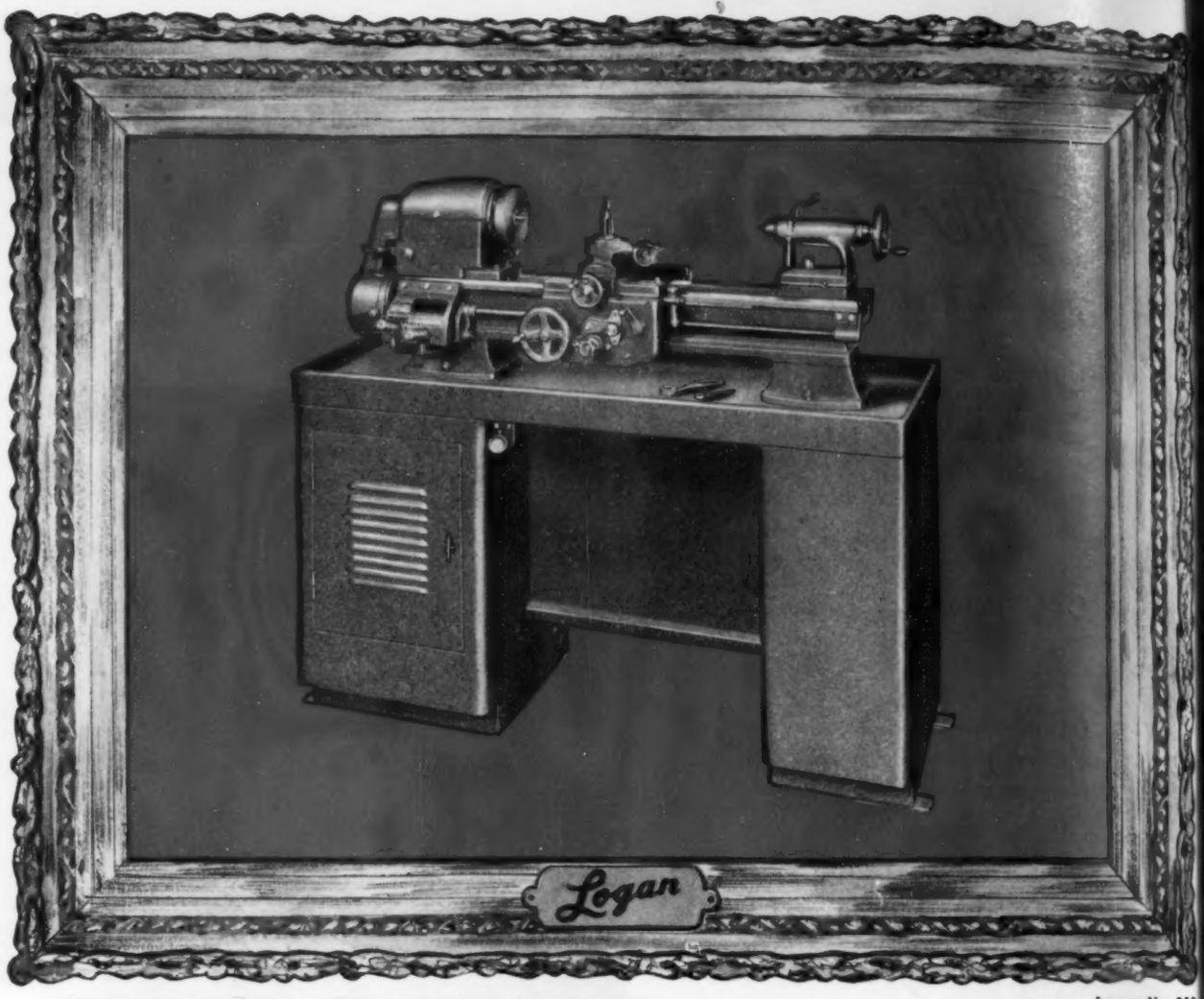
Neither a metallurgist nor a mill man, he has great selling attributes. These have proved vital to Mack-Hemp. Basically a merchandiser, his solid executive abilities have led to numerous directorships. He has also found time to serve on the education committee of the Pittsburgh Chamber of Commerce and as a director of Junior Achievement, Inc.

Always interested in military affairs, he served overseas in World War II. Pearl Harbor found him CO of the 508th Coast Artillery Anti-Aircraft Regt.

The son of a country doctor and bank president in Ohio, Sid now lives in Mt. Lebanon, Pa. Hundreds of friends know his hospitality there and at his farm in Tidewater, Va.

On his Virginia farm he indulges his hobby of raising crops and cattle. He loves farming so much he once tore up the lawn behind his Mt. Lebanon home and planted tomatoes.

Sid gave up golf a few years ago but is still an avid fisherman. He particularly likes what he catches in Canada.



RARE PICTURE:

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The Iron Age

INTRODUCES

Adam J. Hazlett, elected executive vice-president, distribution, JONES & LAUGHLIN STEEL CORP., Pittsburgh. **John B. Mitchell**, elected executive vice-president, production, and **Admiral Ben Moreel**, former president, remains as chairman of the board.

J. A. Sizer, elected president, INDUSTRIAL GEAR MANUFACTURING CO., Chicago. Mr. Sizer succeeds **A. W. Scharek**, founder of the firm, who was elected chairman of the board.

Louis S. Kimball, appointed president, newly re-established, ANGIER SALES CORP., Framingham, Mass.

Cecil M. Peter, named vice-president, Detroit Div., AMGEARS, INC., Chicago.

Robert P. Williams, Jr., elected vice-president, RHEEM MANUFACTURING CO., New York.

George L. Ratcliffe, elected a vice-president, NATIONAL LEAD CO., New York.

George C. Worthley, appointed general manager, Scale Div., FAIRBANKS, MORSE & CO., Chicago. **Joe S. Peterson** succeeds Mr. Worthley as sales manager. **Gordon R. Anderson**, appointed general manager, Electrical Div., and **W. H. Kingsley**, appointed sales manager.

H. R. Knust, appointed superintendent, mechanical department, Sparrows Point plant, and **W. G. Smith**, appointed assistant general manager, Lackawanna plant, BETHLEHEM STEEL CO. Mr. Knust succeeds **L. F. Coffin**, recently made assistant general manager.

Herbert F. Lundstrom, appointed manager, AMERICAN CAN CO., Stockton, Calif.

J. R. Barefoot, Jr., elected president, RESISTANCE WELDER MANUFACTURERS ASSOCIATION, Philadelphia.

William H. Taylor, appointed general sales manager, TINNERMAN PRODUCTS, INC., Cleveland. Mr. Taylor was formerly director of engineering and assistant to the vice-president.

William B. Sherman, named sales manager, Wahlstrom-Float Lock sales department, Products Div., AMERICAN MACHINE & FOUNDRY CO., New York. **Charles Wiedmann**, former sales manager, will assist Mr. Sherman.

James A. Hale, appointed district sales manager, Cleveland office, YOUNGSTOWN SHEET & TUBE CO., Youngstown. Mr. Hale succeeds the late **F. A. Olmstead.**

Karel Vettewinkel, appointed assistant to the manager, and **Casper Wickemeyer, Jr.**, appointed general superintendent, Chicago Branch, NATIONAL LEAD CO., New York.

James P. Growdon, becomes engineering consultant on hydraulic and related engineering problems, ALUMINUM CO. OF AMERICA, Pittsburgh. **B. J. Fletcher**, assistant chief hydraulic engineer, succeeds Mr. Growdon as chief hydraulic engineer.

W. Lyon, appointed sales manager, MIDWAY TOOL CO., INC., Melvin, Ohio.

W. C. Boren, Jr., elected chairman of the Board of Directors, and Executive Committee; **N. P. Hayes**, elected president; **W. C. Boren**, elected vice-president; **W. Hoyt Boone**, re-elected vice-president; and **D. C. McLennan**, re-elected secretary and treasurer, CAROLINA STEEL & IRON CO., Greensboro, N. C.

C. L. AUSTIN, elected president, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Austin was formerly executive vice-president.

ROBERT F. HODGSON, former sales manager and chief engineer, appointed vice-president, Hydraulic Equipment Co., Cleveland.

J. H. TREDINNICK, former vice-president, Hastings, Michigan, Div., named executive vice-president, E. W. Bliss Co., Toledo.

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Personnel

Continued

Paul R. Ehrgott, appointed assistant to the vice-president, Lima-Hamilton Div., BALDWIN-LIMA-HAMILTON CORP., Lima, Ohio. **J. W. Hardesty**, appointed sales manager.

C. F. Sponsler, appointed manager, Land Transportation section, Transportation Dept., WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

Robert N. Nelson, appointed sales manager, Pneumatic Div., SUNDSTRAND MACHINE TOOL CO., Rockford, Ill.

Howard Terhune, joined LOEWY CONSTRUCTION CO., INC., New York, as project design engineer, Counter-Blow Hammer Div.

R. G. WINGERTER, named assistant general manager, and **J. R. Splitstone**, named district manager, TIMKEN ROLLER BEARING CO., Canton, Ohio.

J. E. Hovis, named general manager, and **H. J. Howe**, appointed secretary, BLOOM ENGINEERING CO., Pittsburgh.

Michael Stumm, advertising manager, CRUCIBLE STEEL CO. OF AMERICA, New York, appointed second vice-president.

Jack M. Stone, appointed superintendent, openhearth department, Ensley, Ala., works, TENNESSEE COAL, IRON & RAILROAD CO. **John C. Pugh** succeeds him as assistant superintendent, and **Morris E. Boyd** succeeds Mr. Pugh as night superintendent.

Russell F. Derr, appointed district sales manager, Detroit Office, PITTSBURGH STEEL CO.

John D. Iversen, appointed general superintendent, MESTA MACHINE CO., Pittsburgh. Mr. Iversen succeeds the late **John R. Berg**.

Weyman H. Billings and **Robert P. Gunderson**, assigned as assistant engineers, blower and condenser section, ALLIS-CHALMERS MANUFACTURING CO., Milwaukee.

Lowell T. Smith, appointed assistant metallurgical engineer, metals department, Research and Development Div., OLIN INDUSTRIES, INC., East Alton, Ill.

J. A. Wilson, Jr., named supervisor of design and drafting, C. A. NORGREEN CO., Denver.

JACK J. LEVAND, elected vice-president, Luria Brothers & Co., Inc., Philadelphia.

MILTON J. WEBER, appointed vice-president, Procurement, Frank G. Hough Co., Libertyville, Ill.

GUY HUBBARD, named assistant general sales manager, Bryant Machinery & Engineering Co., Chicago.

DR. GEORGE O. CURME, JR., elected a director, Union Carbide & Carbon Corp., New York.

The Iron Age
FOUNDED 1855
Technical Articles

Develop New Forging Techniques FOR AIRCRAFT PARTS

By G. W. Papen
Manager
Production Engineering Dept.
and

W. Schroeder
Research Engr.
Lockheed Aircraft Corp.
Burbank, Calif.

Techniques have been studied for forging of aircraft outer skin panels. Parts are thin, and have integral stiffening ribs. Forgings with webs thinner than 0.1 in. have been made with draft angles as low as 1°. Areas of forgings are much larger than conventional practice would indicate the press could handle.

Techniques have been developed which permit press forging of pieces thinner than 0.09 in., with draft angles as low as 1° or even zero. And even with the limited press capacity available, it was possible to forge pieces with much larger area than conventional practice would indicate. These techniques are being developed in research work on forging integrally stiffened structural panels for aircraft.

Currently used handbook data would indicate that forging of structurally efficient integrally stiffened sections is not feasible. Draft angles of 7° and web thicknesses of 0.44 to 0.5 in. are recommended. These standards, however, apply specifically to hammer forging practice. And, though there is much literature on press forging, it has little application to the forging of integrally stiffened panels.

Since 1945 Lockheed has been actively engaged in development of integrally stiffened structures and the means for producing them. (THE IRON AGE, Feb. 1, 1951, p. 99.) Investigation of forging has shown that a structurally efficient section can be forged by progressive means in 75S aluminum alloy.

On the basis of these preliminary results, a program of testing the forging of 75S alloy, as well as 14S and Dow FS magnesium alloy was begun. Die design, die construction, and forging was done by Wyman-Gordon Co., Worcester, Mass. Major decisions regarding procedure were made in discussions between Wyman-Gordon, Lockheed, and Air Force engineers. The press used is shown in Fig. 1.

The feasibility of raising metal above the level of the blank into relatively narrow die cavities

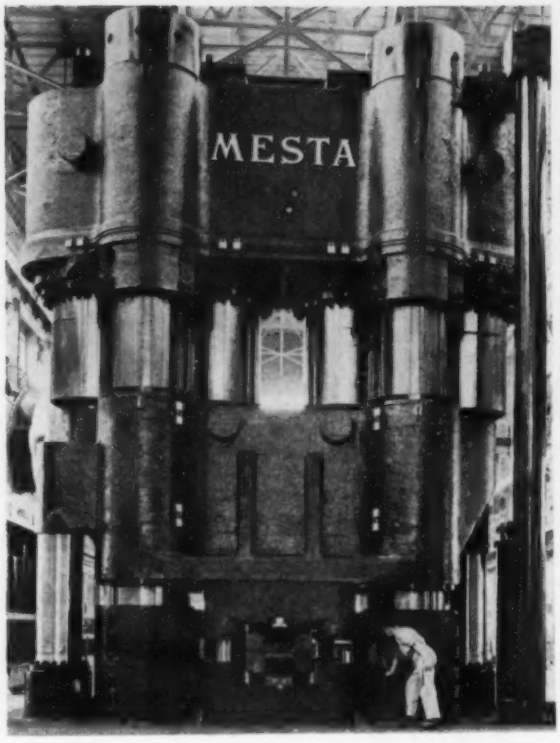

FIG. 1—The 18,000-ton press used by Wyman-Gordon in the experiments on forging integrally-stiffened panels.

New forging techniques (continued)

when ample pressure is applied was adequately demonstrated in the first as well as later phases of the investigation.

The objective in the second phase of the investigation was concentrated on reducing the resistance to flow by modifying die design, improving lubrication and die finish, and heating the dies to adequate forging temperature.

Probably the most radical departure from normal forging practice in this phase was use of an extruding principle to reduce friction in the forging of stiffener ribs. The impression was actually undercut just below the stiffener radius. Once the rib had forged past this point, skin friction was eliminated. This permitted concentration on the effect of skin and internal friction with the movement of metal normal to the forging ram action. Fig. 2 shows how the die is undercut.

In the dies used, the entire impression was cut in the lower die with the top die flat. Dies were hand polished to a high finish using a series of emery papers. Polishing was done wet using a solution of colloidal graphite in water and completing the treatment with colloidal graphite in linseed oil to prevent rusting. The polished and impregnated dies were preheated in a furnace to approximately forging temperature prior to the first forging run.

This preheating served to bake in the impregnated graphite, thus imparting some lubricating qualities to the die surface. However, the primary purpose of die heating was to maintain the dies at or near forging temperature to prevent chilling of the sheet stock. Preheating was supplemented by use of gas burner rings while dies were in the press. These burners helped, but it was found that die temperature became nonuniform after a time, necessitating return to the furnace.

Integrally stiffened panels having the desired dimensional characteristics were produced. Web thickness down to and below 0.09 in. were secured with minimum 1-in. high stiffening ribs.

The final phase of testing utilized the test section shown in Figs. 3 and 4. This has a net projected area of 973 in. This section is typical of one class of panels representing current design trends for military aircraft in all respects except size. However, it would be desirable to produce larger panels in many cases.

Calrod elements heat dies

Initial die heating to temperature in this test series was accomplished by a combination of integral Calrod elements and an outside gas heating ring. Die construction is shown in Fig. 4. Both upper and lower dies were of the insert type with the impression in the bottom die. Dies were hand polished with colloidal graphite in linseed oil, polishing being done in a direction parallel to metal flow.

Various lubricants were tested. Of these, a mixture of 25 pct colloidal graphite in Transformer X oil was selected as preferable. A mixture of 50 pct flake graphite in a lead base had a slightly lower coefficient of friction, but the danger of an objectionable accumulation of graphite on the die is less for the colloidal mixture.

The most serious factor found to limit the forging of thin panels is the inherent tendency for the surface to suck in, or depress, on the surface opposite the stiffener bases. The tendency to suck in appears to be a function of the stiffener configuration and the skin thickness. The tendency becomes more pronounced for thin skins and large thick stiffeners. The effect on suck-in

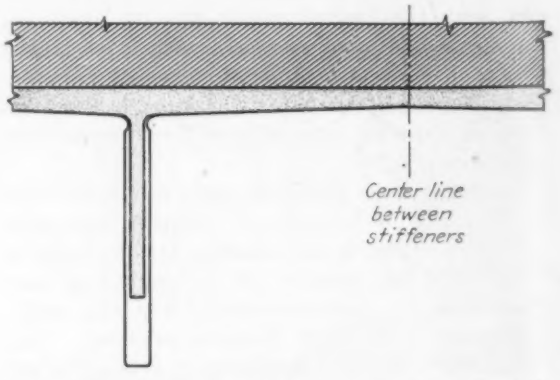

FIG. 2—Sketch showing how rib cavity is undercut to reduce friction. Ribs are actually extruded into cavity.

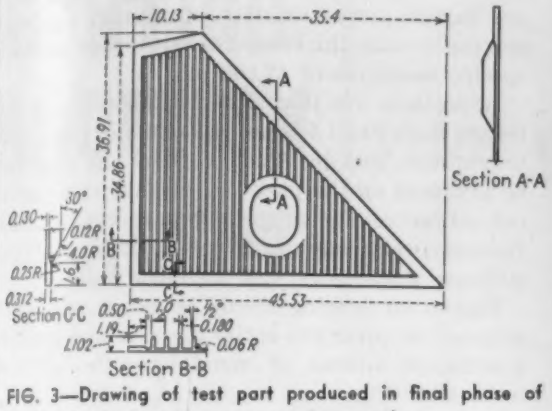

FIG. 3—Drawing of test part produced in final phase of forging tests. Part is an upper wing panel.

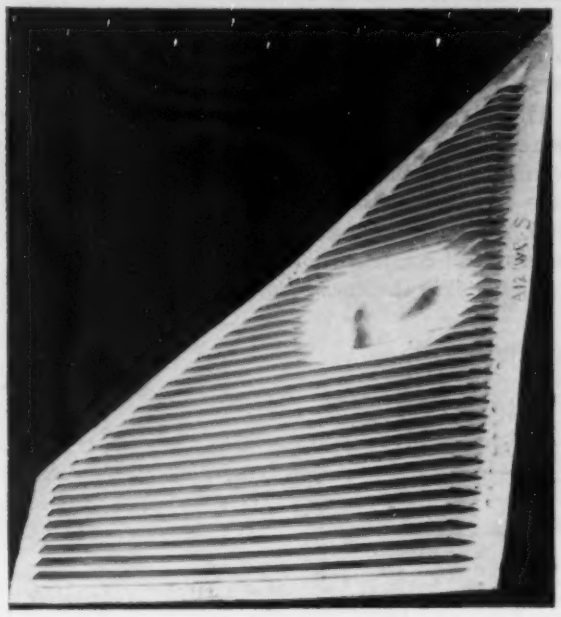

FIG. 4—Upper wing panel section as forged in a die like that in Fig. 5—Panel has been straightened after forging.

of various procedures was tested, with inconclusive results.

A typical configuration and area that may be produced is indicated in Fig. 6. The area of the part actually forged with 18,000 tons pressure is 973 sq in. The maximum area predicted according to normal practice is 350 sq in.

On the basis of these tests, draft angles of from ½° to 1° are at present believed to be practical. Difficulty with sticking was encountered in the tests, but it is believed that a knockout arrangement can be devised which will assist in solution of this. Parts with zero draft angle were actually found possible, by extruding into undercut die cavities. However, undercut die cavities are very difficult to machine for the usual type of part.

Tests showed a relatively small fillet radius—0.06 in.—to be the most satisfactory. Larger radii are undersirable from the structural efficiency standpoint and are believed to contribute to the tendency to suck in at each rib.

The ratio of stiffener height to thickness is one of the important design factors governing required forging pressure where a stiffener draft angle is used. Ratios as large as 7 have been forged successfully. When the rib extrusion technique is used, the ratio is limited only by the depth of the cavity and the ability to maintain lubrication for large amounts of metal flow over the die radius. In either technique, not all ribs can be bottomed in the die cavity, so stiffener height in the as-forged condition will be variable. Thus a rib height greater than desired

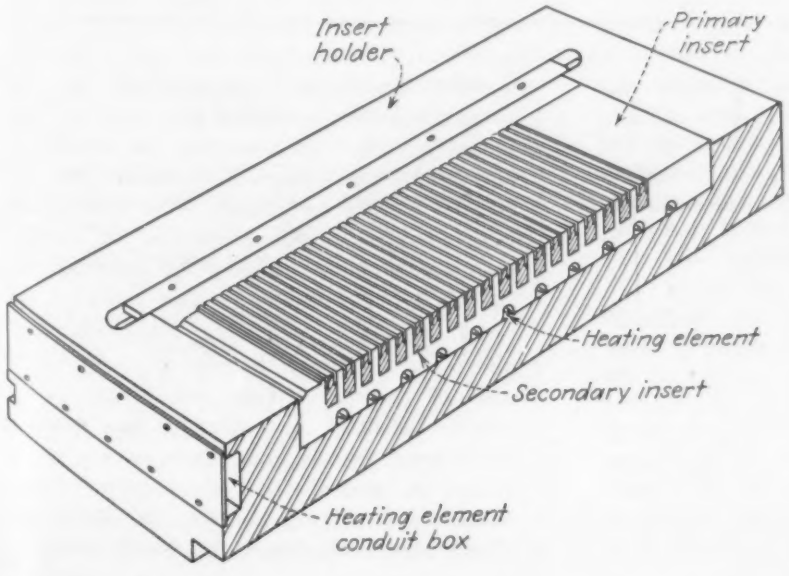

FIG. 5—Construction details of insert-type dies used in final phase of program. Dies are electrically heated.

must be provided and machining will be necessary to provide uniform rib heights.

The forging pressure required increases and decreases as the stiffener spacing increases and decreases. From the standpoint of forging pressure the skin thickness is a useful measuring stick for expressing the stiffener spacing. For example, all configurations with a spacing of 10 times the skin thickness requires similar average pressures. Thus pressure requirements are not altered if stiffener spacing and skin thickness are varied proportionately. Ratios of stiffener spacing to skin thickness 20 were produced with specific pressures of 37,000 psi.

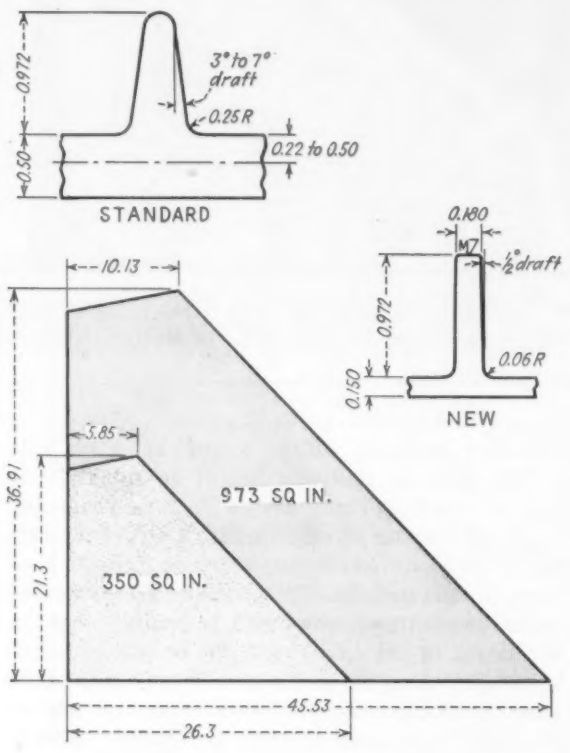

FIG. 6—Comparison between dimensions of an upper wing panel as it would have to be designed if forged according to current practice, and as actually designed and forged by Lockheed and Wyman-Gordon in tests for the Air Force.

Indications are that skin thickness should not be less than 1 to 1.5 times the stiffener thickness, to minimize suck-in. Thick borders and pads can be produced on the part. Large thin areas without stiffeners are almost impossible to obtain. However, relatively narrow areas, 20 to 30 times stiffener thicknesses, can be made thinner.

Blanks for forging should be flat or preforged shapes that cover the entire die area and provide a sufficient volume of metal near the cavities to be filled.

The inclusion of electrical heating elements, and the large number of narrow cavities all of which must be thoroughly polished, make a construction using die inserts advantageous.

Design to eliminate die deflection is important. One of the means under study is compensation for elastic distortion of the die and platen by using a tapered shim between the die and platen. This would be made to vary in thicknes in the same manner as the die deflects.

A press designed especially for this work should have extra platen rigidity and continuous pressure control. The bed size need not be large, but capacity up to 72,000 tons is desirable.

These investigations point the way for further research. For example, large skin thickness tolerances are necessary because of large die deflections. Methods for elimination of or compensation for deflection should be developed. And, minimum web thicknesses are limited by suck-in. It is believed this can be minimized by further development work. A better lubricant for press forging is needed. Die steels capable of withstanding greater unit pressures would be valuable. Finally, further development work is indicated, directed toward applying the findings of this program to other types of forgings.

NEW BOOKS

"*ASTM Standards on Petroleum Products and Lubricants*," latest edition, presents within compact, readily usable form, most of the ASTM standards, test methods, and specifications widely used in this field. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $6.40. 784 p.

"*Shrink Table Sheets*," a book of accurate dimensions to use in production of patterns, dies, etc., for making sand, permanent mold, die cast and "C" process castings. Decimal equivalents for all dimensions from 1/64 in. to 12 in., compensated for material shrinkages from 1/32 in. per ft to ½ in. per ft. Arrow Pattern & Engineering Co., Box 823, Erie, Pa. $1.00. 18 p.

"*Powder Metallurgy*." Information in this volume has been published previously in individual reports. The book brings together in one volume much important research information on powder metallurgy. Ten studies deal with production and properties of sintered metals and alloys. Among the materials considered are 28 commercial iron powders, sintered iron-copper compacts, copper-aluminum alloys and titanium. Studies of surface energies of various metals and binary alloys, powder densities, and strength and hardness of sintered metals and alloys have been included in this British Government report. British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $4.25. 159 p.

CONTROL ADDITION AGENT vital in lead-tin plating

By J. B. Mohler
Director of Research
Johnson Bronze Co.
New Castle, Pa.

Close control over addition agents is needed for best results in lead-tin plating. Small amounts of copper, antimony or arsenic increase strength and fatigue resistance. Gelatin or glue in the bath give a fine-grained deposit. Resorcinol minimizes change in deposit composition; best determined by bromination method.

Chief difference between the modern lead-tin plating bath and that of 30 years ago is that resorcinol has become well established as a useful secondary addition agent. The fluoborate bath is still preferred and blue is still used as an addition agent.[1,2] Close control over addition agents must be maintained for satisfactory continuous plating.

In earlier baths fluoboric acid was made from hydrofluoric and boric acids. The process, though simple, is unpleasant and hazardous without chemical processing equipment. Fluoboric acid and lead and tin fluoborate concentrates are available and bath makeup is simple.

Lead and tin are soluble in other acids commercially available and fair success has been attained with sulfamic and perchloric acids. Due to consistent plating quality, fluoboric acid has been accepted as a standard bath. Fluoboric acid is stable as are the lead and tin salts of this acid so that bath life is assured.

Anode and cathode efficiencies of the lead-tin bath are close to 100 pct and high plating rates can be obtained. Throwing and covering power, however, are poor.

Lead-tin deposits are soft, and unpleasing in color. Use, therefore, is restricted to economic or engineering applications. For corrosion resistance it is used in battery parts, chemical and oil containers or sheet roofing. It is used as a break-in surface for machine parts or as a running surface for bearings.

Addition of tin to a lead fluoborate plating bath[3] has an addition agent effect. The deposit can be modified for increased strength and fatigue resistance by addition of small amounts of copper,[4] antimony or arsenic.

During operation a lead-tin bath changes continuously. A reliable formula that guarantees composition of the deposit is not available. Quantities and frequency of bath additions cannot be specified in advance.

Control of stannous tin and glue are the only critical factors in bath operation. Other bath chemicals can be controlled to specified limits. The lead-tin bath contains fluoboric acid, boric acid, lead fluoborate, stannous fluoborate, stannic fluoborate, resorcinol and gelatin.

Fluoboric acid renders the metals soluble. Addition of acid beyond this amount, the "free" acid, increases bath conductivity. Concentration of free acid is not critical but should be controlled. Tin in the bath causes inconsistent results if the method of titration for free acid is used that is ordinarily used for a lead fluoborate bath. Tin also interferes with pH measurement. The best known method for control of free acid is by colorimetric pH. A pH range of 0.5 to 1.5

is satisfactory. Free fluoboric acid may be 30 to 50 g per liter in this range.

Boric acid is not essential to bath operation but some free boric acid is usually added to make certain that all the hydrofluoric acid has been reacted. Any free hydrofluoric acid in the bath reacts with soluble lead to precipitate lead fluoride. Free boric acid does no harm to the bath and control limits of 20 to 30 g per liter are satisfactory. Boric acid content is estimated by determining the additional amount required to saturate a sample portion of the bath.[5]

Lead fluoborate limiting factor

Concentration of lead fluoborate, major metal in the bath, limits operating characteristics. Good results can be obtained with concentrations from 50 to 200 g per liter. As the lead concentration is increased, the limiting current density is increased. Since drag-out is higher at higher concentrations, 100 to 110 g per liter of lead is recommended. The lead may be determined by precipitation as lead sulfate.

Tin is added as stannous fluoborate solution. As the bath is used, part of the tin oxidizes to stannic fluoborate. The stannic fluoborate is not useful so it is only necessary to analyze for stannous tin by titration with iodine.

An occasional analysis for total tin is desirable to determine when the bath has reached equilibrium. Equilibrium is usually obtained when stannous tin and stannic tin are present in approximately equal concentrations.

Resorcinol, a stable chemical, is best controlled to definite limits and can be determined by a bromination method.[6]

Gelatin or glue are added to obtain a fine-grained deposit and maintain limiting current density. An analysis for gelatin is of no value.

Dissolved gelatin forms colloidal solution

Gelatin dissolved in water forms a colloidal solution. The colloid accounts for the addition agent effect. Colloidal gelatin will take on both positive and negative charges. A portion that migrates to the anode will polymerize and form a light harmless film on the anode. A portion that migrates to the cathode will be co-deposited so that a very small amount is occluded in the deposit. The colloidal solution will gradually decompose so that eventually the gelatin breaks down and enters true solution as amino acids. In this form, it has no value as an addition agent.

Excessive gelatin causes the deposit to become brittle and streaked. If gelatin is not used, the deposit will be crystalline and contain no tin. A gelatin concentration of 0.1 to 1.0 g per liter is used, usually added to a fresh bath. Good results with a lead-tin bath are obtained by daily additions of gelatin of 0.01 g per liter and daily use of the bath. If the bath is not used for several days no harm will result.

With long use of a bath, it may be necessary to make a larger addition of gelatin. This will easily be recognized by a drop in the percentage of tin in the deposit. If too much gelatin is present or the gelatin is converted to a harmful form, trouble can usually be avoided by a plating range test.

Lead-tin baths have been operated for long periods without trouble on a predetermined schedule for gelatin additions. Apparently an excess or deficiency of gelatin causes loss of control that can be avoided by frequent small additions.

If glue is used, larger additions will be required. If the quantity added daily is too small, there will be a gradual loss of addition agent effect. If quantities are too large, the deposit will become streaked. Tendency of the deposit to become streaked or rough may be detected on a plating range test, before trouble is encountered on the work. Rough or streaked plating can be corrected by treatment of the bath with activated carbon followed by filtration.

The daily gelatin or glue requirement can be determined by watching the bath for drift toward crystalline plating or rough plating. If crystalline plating is encountered, a larger quantity of gelatin will correct the condition. If rough plating is indicated, it may be corrected by stopping the gelatin additions for a week.

A plating range standard on a fresh bath is useful for bath control purposes. Fig. 1 shows a plating range standard for lead-tin bath No. 1 using a 4-in. slot cell (Fig. 2). The average cathode current density used for the test panel was 20 amp per sq ft. Bath No. 2 shows a section of a test panel for low addition agent. Bath No. 3 shows a test panel section for excessive addition agent.

Streaks on the panel indicate trouble may develop if further addition agent is added or if the bath is not used. If corrective steps are desired, testing can be done on small portions of the bath followed by further plating test. Electrolysis may cure the trouble. At times, an addition of gelatin may help even though this is not

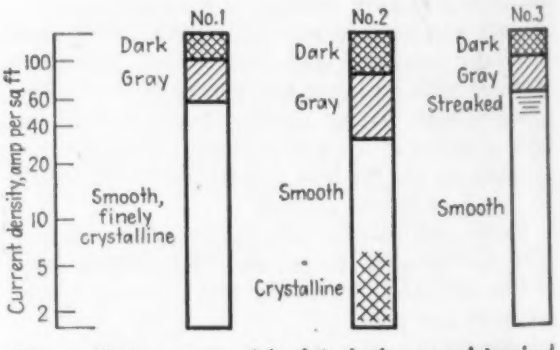

FIG. 1—Plating ranges of lead-tin baths were determined using 4-in. slot cell. Bath No. 1 current density averaged 20 amp per sq ft. Bath No. 2 is low in addition agent. Bath No. 3 had excessive addition agent.

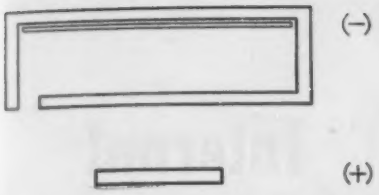

FIG. 2—Plating range of various lead-tin baths was established using 4-in. slot cell.

indicated. If radical changes in the bath are made such as large additions of chemicals or treatment with activated carbon, then it will be necessary to determine the effect on the analysis of the deposit.

If bath No. 1 (see Table) is made up, a deposit of approximately 10 pct tin will be obtained at a cathode current density of 20 amp per sq ft. When the bath is fresh, the tin will be present mostly as stannous tin. A portion of the tin will oxidize to stannic tin with a subsequent drop in tin content in the plate. It will be necessary to add more tin.

After a number of weeks, an equilibrium will be reached and changes due to oxidation of tin will be slow. Accumulation of tin and lead in the bath from the alloy anodes will tend to prevent changes in composition of the deposit after the bath has been used.

It is not possible to predict the exact bath composition to obtain deposit compositions within narrow limits. This will vary with bath conditions and with the work load. To control the bath within a narrow deposit analysis range, it is necessary to keep a log so adjustments can be made to the desired analysis.

Gelatin and tin are the only chemicals critical to control in bath No. 1. Resorcinol is added to minimize change in the composition of the deposit with change in current density.[7] At low resorcinol concentrations, the tin in the deposit increases with increase in current density in the low current density range. At high resorcinol concentrations, tin in the deposit decreases with increase in current density.

Limiting cathode current density of bath No. 1, about 50 amp per sq ft, may be used for light deposits. For heavy deposits consistent results can be obtained at a current density of 20 amp per sq ft.

TYPICAL BATH MAKEUP

	No. 1 Grams per Liter	No. 2 Grams per Liter
Lead	100–110	25
Tin (total)	15	60
Stannous tin	.....	55
Free fluoboric acid	40–50	80
Free boric acid	20–30	25
Gelatin	1	.....
Glue	.....	5
Resorcinol	2–3	.....

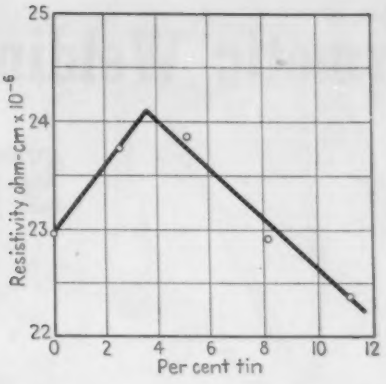

FIG. 3.—Resistivity of lead-tin alloys at 25°C.

Limiting current density may be increased by increasing the total metal content of the bath. Doubling the metal content, however, may only increase current density 20 to 30 pct. If total metal content of the bath is decreased, the bath will operate satisfactorily at lower current densities.

A more dilute bath will respond to the self-controlling influence of the anode composition more readily than a concentrated bath. The lead-tin deposit is not limited to low tin compositions. Lead and tin may be deposited in all proportions.

Bath No. 2 was proposed by Seabright for depositing alloys of 60 pct tin, 40 pct lead for soldering applications.[8]

Bath No. 2 is similar to bath No. 1. Using glue or gelatin with or without resorcinol, lead-tin baths may be formulated that will deposit much more tin than lead. Although the alloys are tin-base in this range, bath formulation is essentially that of an acid lead bath. For baths low in lead, formulation must be that of an acid tin bath.

Noble metals may be added

Other metals may be added to the lead-tin bath to deposit ternary alloys. Copper, antimony or arsenic may be added in small amounts.[9] The noble metals may be added up to several g per liter to deposit up to 3 pct in the deposit. These produce a harder, finer-grained deposit.

Solubility of tin in a lead-tin deposit is about 3.5 pct. To this point properties of the deposit will change. Hardness, corrosion resistance, and resistivity (Fig. 3) will increase.[10] Change in resistivity can be used for rapid analysis of the composition.

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[6] Ibid, p. 226.
[7] The Iron Age, July 13, 1950, p. 94.
[8] Seabright, L. H., Metal Progress, Oct. 1949, p. 509.
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Hermetic Welding STOPS Internal Corrosion

By Bernard Gross
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Hermetic welding has successfully stopped internal corrosion of tubular aircraft structures such as engine mounts. Over 200,000 such parts fabricated at Rohr Aircraft Corp. since 1942 have given satisfactory military and commercial service. Newer, more sensitive leak detection methods spot flaws; welding procedures improved.

Greater loads than ever before are being imposed on aircraft structures. Power packages weighing more than 5000 lb impose critical loads. This weight is supported by a welded tubular engine mount secured to the wing structure by as few as 4 bolts. Internal corrosion protection of this and other welded tubular assemblies is of vital importance.

Engine mounts of large aircraft are now being fabricated which weigh more than a tubular fuselage frame of a small airplane of the "tubing and fabric" vintage. The problem of applying the long used hot internal coatings for rust-proofing became difficult in recent years because of the complex design configurations of welded tubular construction.

The internal coating process proved inadequate in service because modern aircraft encounter severe environmental conditions. As the plane flies higher, the temperature and pressure of the atmosphere are reduced, resulting in a contraction of air. When the plane lands, temperature and pressure rise with a consequent expansion of air.

This contraction and expansion produces "breathing" of air containing water vapor through holes closed by drive screws and other openings. Fig. 1 illustrates a typical drive screw used to close structures rust-proofed by linseed oil.

Condensed water inside of the welded tubular structures which does not drain out, oxygen and ozone from the air, and temperature changes provide the environment for breakdown of internal coatings and corrosion of the steel. Coatings such as linseed oil are of little value under such conditions as a rust-prevention measure. An internal rust-proofing process by hermetic sealing was described in THE IRON AGE, July 30, 1942. Structures were welded completely closed and after adequate tests for weld

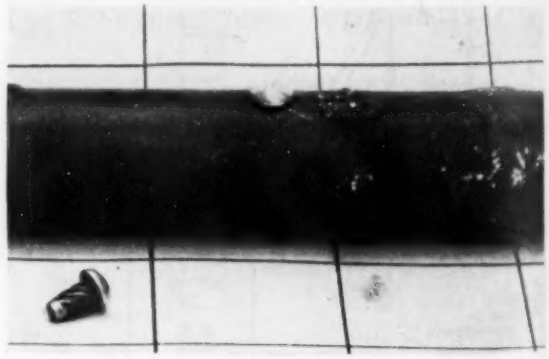


FIG. 1—Typical drive screw used to close structures rust-proofed internally by linseed oil.

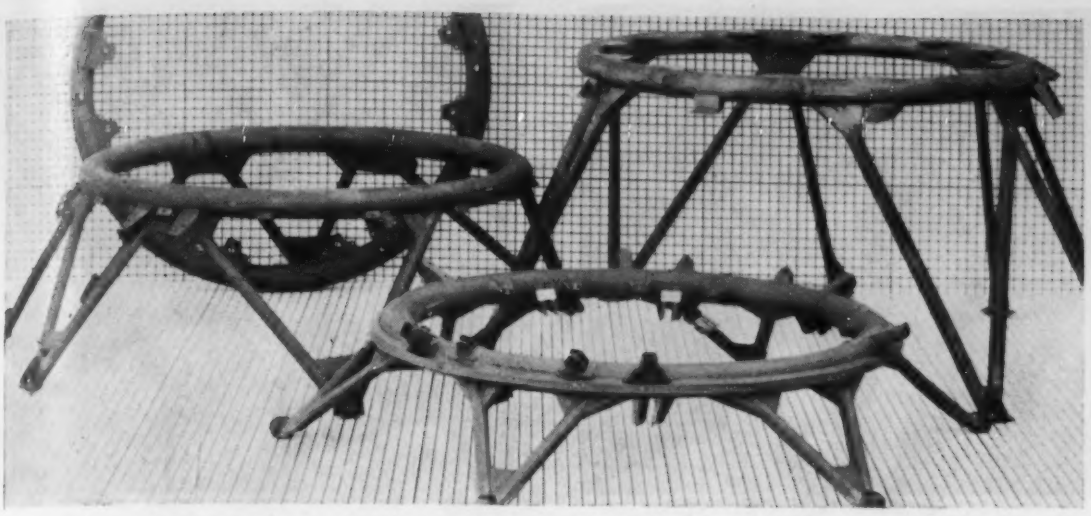


FIG. 2—Hermetic sealing provides internal protection against corrosion in typical welded tubular engine mounts.

soundness, the structure was usually plated externally with cadmium. Since that time, over 200,000 such parts have been fabricated at Rohr Aircraft Corp.

Satisfactory field service on military and commercial aircraft during the past 10 years reflects the dependability of the process. The process has been further developed to a point where hermetic sealing for complex structures is assured by modern testing procedures.

Because testing methods used are sensitive, flaws due to inadequate welding procedure are readily detected when first run parts are inspected. These findings assist in making satisfactory welding procedure corrections for production. Structures are of a quality and dependability which are superior to those formerly produced. While the formerly used bubble fluid testing detected many flaws, newer methods of testing reveal defects that can not be found using a bubble fluid method.

Mounts vary from 60 to 300 lb

A typical group of military and commercial mounts sealed by hermetic rust-proofing are shown in Fig. 2. For large aircraft, engine mounts vary in weight from 60 lb to over 300 lb in contrast to small welded tubular parts which weigh only several ounces. In fabrication of engine mounts, interconnecting holes are provided between the various members, Fig. 3, so that following welding, pressure applied thru a test hole in one member will reach the entire structure. After welding, testing for hermetic seal is accomplished by one of several procedures. The hot water method may be used for the rapid inspection of sealed straight tubular parts and simple flash or arc-welded assemblies. Parts are immersed in a tank of clear water at 200°F±10°F to obtain air pressure and provide a means of detecting leaks.

Throughout immersion, parts are kept near the surface and slowly turned while watching for escape of air bubbles. If any bubbles arise, the point from which the air escapes is marked, the structure repaired, and again tested. The length of immersion time depends, in part, upon the wall thickness of the tubing. Minimum time required for structures made from tubing less or more than 0.052 in. wall thickness is shown in the table.

The pressure and solvent (Kelite Kesolve or equivalent) inspection method is sensitive and may be used to locate leaks in visible areas. It is useful for locating flaws which leak and are difficult to detect. Inert gas or dry air is injected through a test hole at gage pressures between 80 and 100 lb psi.

While maintaining pressure, solvent is poured over each part of the structure. Leakage is detected by observing a sheet of mist produced whenever the solvent flows over small cracks or pores, Fig. 4.

Leaks inside some gussets are evidenced by

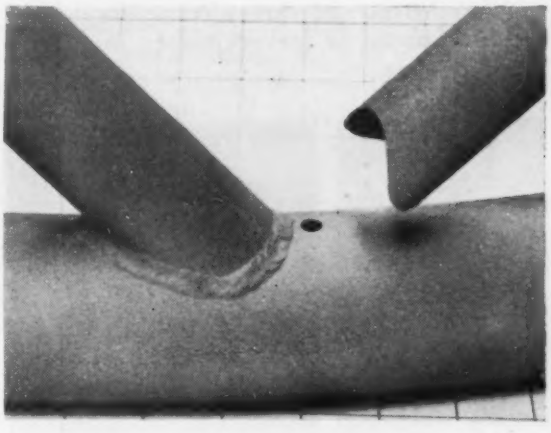
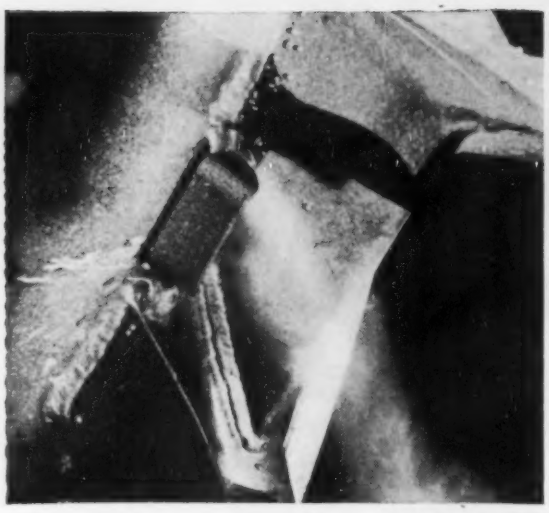


FIG. 3—Interconnecting hole in ring of the sealed engine mount provides continuous passage from ring to leg.



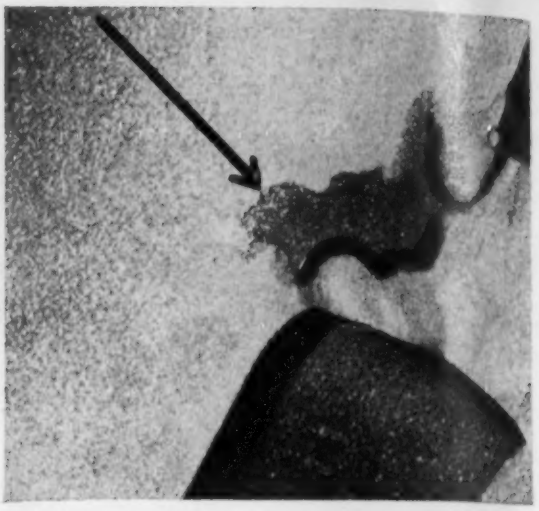


FIG. 4—Solvent mist spots welding flaw, left, at leg and ring joint when pressure and solvent inspection is used. Sandblasted parts, right, show damp area around pin holes several minutes after balance of part is dry.

Internal corrosion stop (continued)

IMMERSION TIME

Wall Thickness of Tubing	Minimum Time
Under 0.052 in.	30 seconds
Over 0.052 in.	1 minute

Note: No leaking part shall be left in the water after bubbles stop rising.

bubbles when the gussets are filled with solvent. The solvent evaporates quickly but on sandblasted parts, a damp area surrounding pin holes and other leaks, Fig. 4, will remain several minutes after the remainder of the part is dry.

The halide detector method (using equipment similar to General Electric type H Leak Detector) detects minute flaws. Defects have been located which were not detectable by magnetic inspection. It is rapid for structures having numerous welds and is used where hidden areas are involved.

Atmosphere in the vicinity of testing should be comparatively free of halide vapors such as trichlorethylene and carbon tetrachloride, and cigarette smoke to prevent errors in the detector reading.

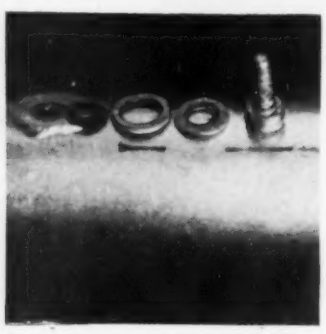


FIG. 5—Test holes with bolt and special seal permit reexamination of structure while in service.

The structure is placed in a test box and the lid closed. Freon No. 12 is injected into the structure thru a test hole until 15±2 lb psi gage pressure is obtained. Inert gas or dry air is added to obtain a total of 60-80 lb gage pressure. A halide detector is used to sample the air in the box. If there is no indication of leakage, after full pressure within the tube has been reached, the structure is acceptable.

After removal of the structure from the test ring, the test hole is sealed by arcwelding. Preparation and welding technique have been established to prevent formation of cracks in the test hole welds. Using 78° countersink, a No. 31 test hole is chamfered about ½ of its depth in order that good penetration may be obtained without overheating.

The area of the test hole is preheated to approximately 350° F. and a 5/64 in. coated electrode used. The hole is welded from the bottom to the outside avoiding excess heat. The final weld closure is inspected for flaws by the penetration dye method.

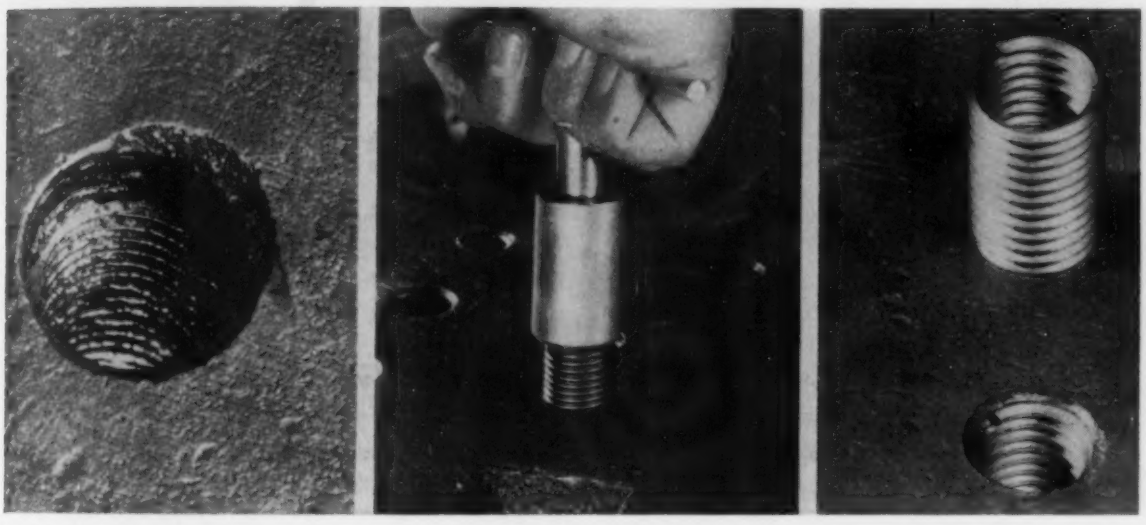
Dye test materials removed

Distortion due to a slow feed of the quenching oil through the test hole is avoided and the need for the removal of quenching oil is eliminated. The safety of this procedure for hardening of closed chrome molybdenum steel tubular structures has been established by tests. All materials used in testing procedures described here are considered non-toxic and non-flammable.

Test now in process will establish the effectiveness of a test hole, sealed with a removable plug, that can be used as a test port during the service life of the structure to determine the presence or absence of flaws. Fig. 5 shows an experimental test hole equipped with a plug and Lock-O-Seal sealing device. This type of seal has been used successfully for over 10 years.

Bolster plate threads quickly repaired with wire inserts

Press down time for repair of bolster plate threads has been substantially reduced through use of helical-wire thread inserts at Stewart-Warner Corp., Chicago. Time savings of 80 pct over conventional repair methods are reported. The stainless steel Heli-Coil thread inserts are formed from wire with a diamond-shaped cross-section. The wire-insert method produces a permanently-repaired thread.



WORN bolster-plate threads, left, are drilled and tapped. Special inserting tool is used, center, to turn insert into tapped hole. Right, insert is shown installed in front hole, started in rear hole. Method cuts press down time.

The oversize-thread method of repaiar requires additional space and uses larger and more expensive bolts. Since 95 pct of bolster-plate holes have $\frac{5}{8}$-11 tapped threads, repair operations by this method result in use of the next larger size thread, $\frac{3}{4}$-10.

Solid-bushings are satisfactory but require excessive "down-time." More than an hour per repaired thread against 10 minutes consumed in repairing one bolster-plate thread with a thread insert is reported.

For the past 2 years, Stewart-Warner has used the wire-insert method. Repair operations are as follows:

(1) The damaged thread is cleaned out with a drill slightly larger than the original thread's major diameter.

(2) The hole is retapped with a standard Heli-Coil tap.

(3) A stainless-steel insert is installed, bringing the hole back to original thread size.

The thread insert is installed with an inserting tool, and positioned so the top coil is one-half turn below the surface of the plate. In a through hole, the inserting tang—an extension of the lead coil bent inward along a diameter to engage the slot in inserting tool—must be broken off after the insert is installed. This is accomplished with a tang break-off tool. On blind holes, the tang is left intact because inserts for this type of hole are specified to lengths prohibiting interference between bolt and tang.

Over 600 inserts have been installed at Stewart-Warner. Most of these have been for $\frac{5}{8}$-11 threads. The method has also been used to recondition $\frac{3}{4}$-10 threads. During this time, no insert has ever stripped, pulled out, or shown any visible deterioration, it is reported.

Strength of the 18-8 stainless-steel wire used in manufacture of these inserts makes the new threads stronger and more permanent than either the original threads or those repaired by other methods.

Since bolster plates are valued at $100 to $150 each, the prolonged life achieved as a result of each wire-insert thread-repair operation represents an additional economy.

Heat treated properties PREDICTABLE in complex assemblies

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Any and all cross-sections have "equivalent rounds." A simple means determining their values in a part or assembly (both welded and other types) makes it possible to predict the mechanical properties after heat treatment in any section.

For many years, selection of a steel for a part requiring heat treating has been based on the limiting section size for through hardening. Such limits are generally determined by hardness gradients measured on properly quenched cylindrical bars of various sizes.

A given part's heaviest section is called the "section thickness" or "section size." Typical examples of these are shown in Fig. 1.

A particular steel is generally employed for section thicknesses equal to or less than the critical cylinder size for through hardening. The final tensile strength is then specified as a range known to be attainable after tempering at a sufficiently high temperature.

This method gives accurate results when the part resembles the cylindrical hardness test specimen. With other shapes, however, actual strength gradients are much different than one would assume. As an example, for a given heat treatment, many tubular parts would have hardness gradients equivalent to those of a cylinder having a diameter over three times their section (or wall) thickness.

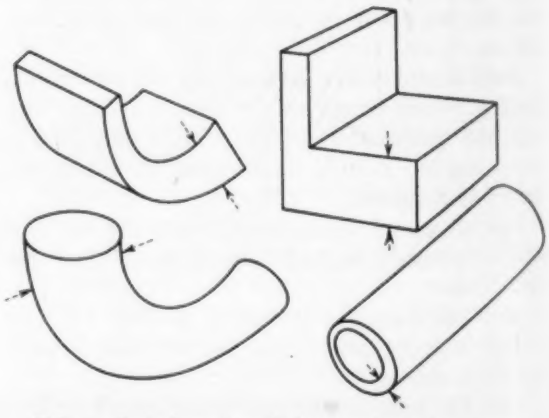


FIG. 1—Typical section thicknesses shown by arrows.

Several other difficulties are encountered in designing normal shapes for heat treatment. Most parts vary in section size, and strength differences between thin and thick sections are brought about by the heat-treatment. Similarly, many heat-treated weld assemblies contain details from different types of steel. This also produces large strength differences.

The inexperienced engineer is apt to design parts impossible or expensive to manufacture and may not be taking proper engineering advantage of his material. The experienced engineer, after having designs modified by production rejections and service experience, generally develops a "feeling" for section thickness. He develops an ability to make close guesses on design.

Method can be used for any shape

To distribute this experience more widely among its engineers, the Douglas Aircraft Co. has devised a standard method for selecting steels. The technique can be used for any shape of heat treatable parts and for specifying heat treatment. The method has been in use for three years. It makes possible:

(1) Selection of the lowest hardenability steel which will develop a surface to core gradient after heat treating of less than 20,000 psi (this figure is arbitrarily selected. Within the limits of Table I this gradient is actually encountered only with a very adverse combination of variables. Except for parts where the "core" is exposed by subsequent machining, this gradient can be neglected in design). The selection can be made accurately for any shape, for extreme variations in cross-section, and for different steels in the same weld assembly.

(2) Obtaining desired strength or strengths in a part or assembly. Differences in section size in a single assembly or different steel requirements in an assembly can be predicted in design. Provision can then be made on the engineering drawing to specify these requirements so that the necessary strength or strengths can be provided without incurring undue high costs. Such strength differences can also be manipulated at will by changes in steels and variations in the rough machining and heat-treating sequence.

TABLE I

MAXIMUM POSSIBLE EQUIVALENT ROUND

For parts critical in fatigue or impact or requiring yield-tensile ratio over 0.8.

Material*	4130	4135	4140	4340
Maximum equivalent round (for all strength ranges), in.	½	1	1¼	4

Oil quenching steels

The system consists of a simple scheme for determining for any shape, the diameter of a cylinder whose center would have the same cooling rate as the center of the part in question. This diameter is called the "equivalent round" for that shape. If, at the time of heat treatment, the part approximates a simple geometric shape, its equivalent round is determined by reference to Fig. 2. If the part does not approximate any of these simple shapes, it is broken into a series of component elements as shown in Fig. 3. These elements are converted to equivalent round values. It is the maximum value for each component that governs the selection of material. The part can then be considered to consist of all the equivalent rounds which must be heat treated simultaneously. In welded assemblies, the maximum value in each detail is used.

Using the largest value, the steel is then selected with the help of Tables I or II. Note that

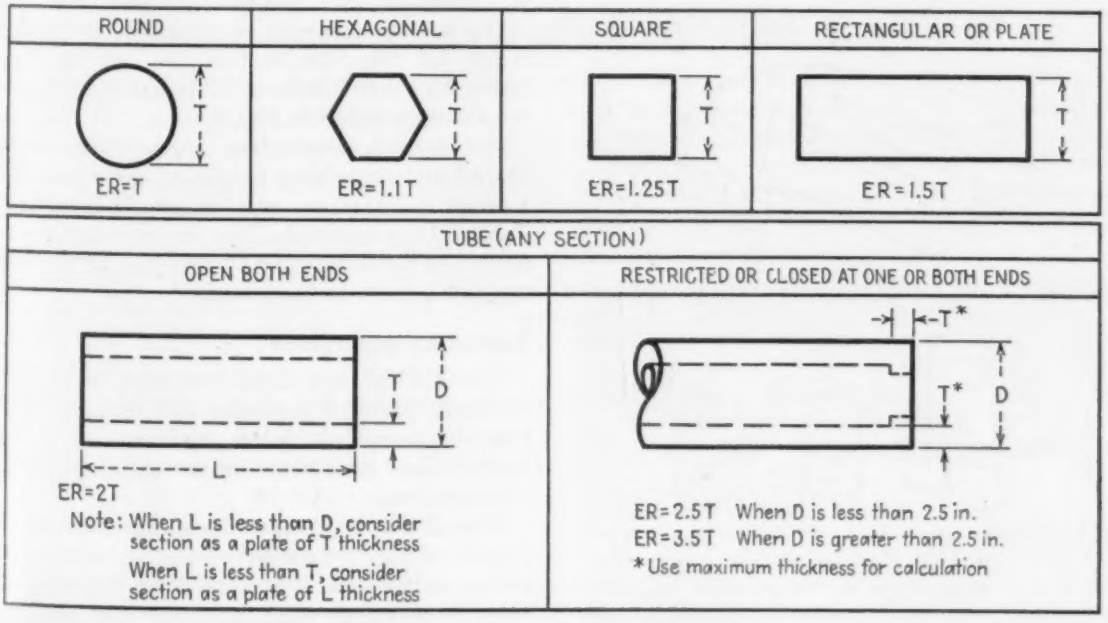


FIG. 2—Equivalent rounds for simple shapes.

TABLE II

EQUIVALENT ROUNDS FOR SOME ALLOY STEELS

For other parts*.

Required Ultimate Tensile Strength (1000 psi)	Maximum Equivalent Round, In.									
	Through ½	Over ½ through ¾	Over ¾ through 1	Over 1 through 1¼	Over 1¼ through 1½	Over 1½ through 1¾	Over 1¾ through 2	Over 2 through 2½	Over 2½ through 3½	Over 3½ through 4
180–200 170–200†	4130	4140 4135‡		4140	....	....	4340	....	....	....
160–180 150–180†	4130	....		4140 4135‡		4140	....	4340	....	....
125–155† 125–145	....	....	4130	....	....		4140 4135‡		4140	....
90–125	....	....	....	4130	....	....	....	4140 4135‡		4140

* Oil quenching steels.
† 4135 steel is available in tubing only.
‡ Strength range for simple welded assemblies.

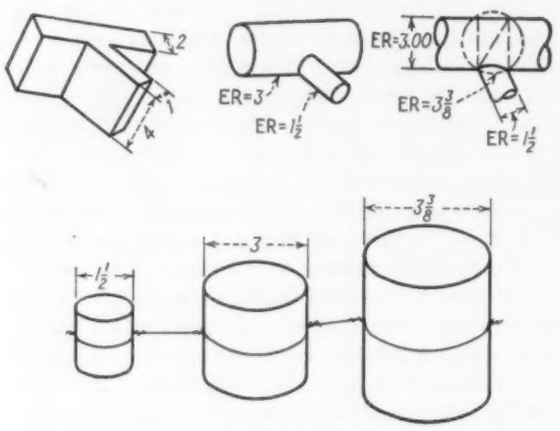
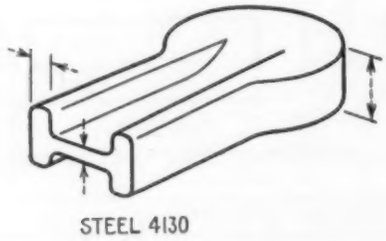


FIG. 3—Actual bar intersection is shown at left. In center, is picturization of same structure as its "equivalent rounds," together with values derived by multiplication of dimensions given with actual part at left by factors in Fig. 2. At right, is shown how equivalent round for the intersection itself is determined.



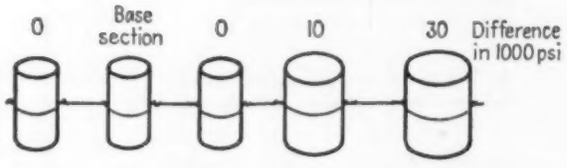


FIG. 4—Illustration of how a part's "base section" is determined. In this case, it is the flange at right of part, where a tensile range of 180,000 to 200,000 psi range is desired. Use of Table III makes it possible to hold 160,000 psi minimum elsewhere in part.

Designing for heat treatment (continued)

any rough machining which can be performed will permit the selection of a lower hardenability steel. These tables, based on allowing only small surface-to-core gradients, are appropriate for parts stressed throughout their sections. Parts stressed primarily in bending or torsion would require tables derived from other criteria.

The strength difference to be expected between sections (and between two steels of a weld assembly) is then determined by reference to Table III. If the strength difference is undesirable it can be decreased by changes in the rough machining sequence or the steel selection.

For simple shapes, 20,000 psi range

For simple shapes the final engineering requirement is then stated as a range in tensile strength of 20,000 psi. Where parts show strength differences (Table III), this should be added to or subtracted from the tensile range. An alternative for such parts is to determine the normal range for the base section and set allowable limits for other locations. This has been done in the example shown in Fig. 4.

For welded assemblies, even when simply shaped and containing details of the same steel, a range of 30,000 psi or more (as determined by Table III) is specified. This allows suitable compensation for differences in response of the various detail parts to hardening.

Tested by experience

The method and data presented here were originally based on published data combined with intuitive reasoning. Some modifications of borderline cases were made on the basis of production experience.

The equivalent rounds of several of the simple shapes in Fig. 2 were arrived at by analysis of cooling curve data. The method for intersections (Fig. 3) was arrived at intuitively and has been found to be reasonably correct. The data in

TABLE III

STRENGTH DIFFERENCE DATA*

"Base Section" Material and Equivalent Round, In.		Values Shown are in 1000 psi	"Other Section" Material and Equivalent Round, In.																	
			4130					4135					4140						4340				
			¼	½	1	1½	2	¼	½	1	1½	2½	½	1	1½	2	3	4	½	1	2	3	4
4130		¼	0	0	−10	−30	−40	+10	0	0	−10	−30	+15	+10	+10	0	−15	−30	DO NOT USE				
		½	0	0	−10	−30	−35	+10	0	0	−10	−30	+15	+10	+10	0	−15	−30					
		1	+10	+10	0	−20	−30	+15	+15	+10	0	−25	+20	+15	+15	+10	−10	−25					
		1½	+30	+30	+20	0	−10	+35	+30	+30	+25	0	+40	+35	+35	+30	+20	0					
		2	+40	+35	+30	+10	0	+45	+40	+40	+35	+15	+50	+45	+45	+35	+30	+15					
4135		½	−10	−10	−15	−35	−45	0	0	−10	−15	−35	+10	0	0	−10	−20	−35	DO NOT USE				
		½	0	0	−15	−30	−40	0	0	0	−15	−35	+10	+10	0	−10	−20	−35					
		1	0	0	−10	−30	−40	+10	0	0	−10	−35	+15	+10	+10	0	−15	−35					
		1½	+10	+10	0	−25	−35	+15	+15	+10	0	−25	+20	+20	+15	+10	−10	−25					
		2½	+30	+30	+25	0	−15	+35	+35	+35	+25	0	+40	+40	+35	+30	+20	0					
4140		½	−15	−15	−20	−40	−50	−10	−10	−15	−20	−40	0	0	−10	−15	−25	−40	DO NOT USE				
		1	−10	−10	−15	−35	−45	0	−10	−10	−20	−40	0	0	0	−15	−25	−40					
		1½	−10	−10	−15	−35	−45	0	0	−10	−15	−35	+10	0	0	−10	−20	−35					
		2	0	0	−10	−30	−35	+10	+10	0	−10	−30	+15	+15	+10	0	−15	−30					
		3	+15	+15	+10	−20	−30	+20	+20	+15	+10	−20	+25	+25	+20	+15	0	−20					
		4	+30	+30	+25	0	−15	+35	+35	+35	+25	0	+40	+40	+35	+30	+20	0					
4340		½	DO NOT USE																0	− 5	− 5	−10	−10
		1																	+ 5	0	− 5	−10	−10
		2																	+ 5	+ 5	0	−10	−10
		3																	+10	+10	+10	0	− 5
		4																	+10	+10	+10	+ 5	0

* Ultimate tensile strength.

Instructions:

Arbitrarily select any location of the part having a known equivalent round. This location is termed a "base-section" in the table. To determine the strength difference between the base section and any other section, find the location on the table corresponding to the appropriate combination of steels and equivalent round sizes. A plus sign indicates the "other section" is stronger than the base section.

Example: Base section—¼ in. equivalent round, 4130.
Other section—1½ in. equivalent round, 4130.
The other section will be 30,000 psi lower in strength than the base section.

Table III was originally arrived at by estimating "as-quenched" gradients for various equivalent rounds in the steels listed, based on hardnesses of significant locations in Jominy bars. The gradients after tempering were then determined from unpublished data. The strength differences have proved to be workable averages over the strength ranges and hardenabilities concerned.

The author wishes to thank C. A. Hedges for his help in organizing the data; F. T. Wood, Jr., L. Schapiro and O. A. Wheelon for their encouragement of this development, and the Douglas Aircraft Co. for permitting use of data.

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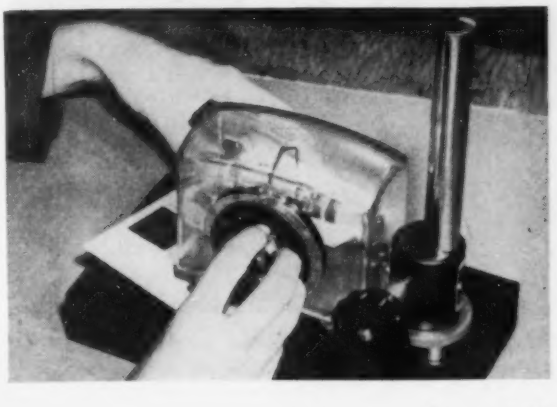
Magne-gage tests plated surfaces quickly

National Bureau of Standards has developed nondestructive magnetic methods for measuring the coating thickness, provided that either the coating or the basis metal is magnetic. These methods are employed in an instrument known as the Magne-gage, which was designed at NBS but is manufactured commercially. Each Magne-gage is calibrated at NBS before it is sold. Over 4,000 are now used.

The Magne-gage shown in the photo, measures the thickness of both single and composite electro-deposited coatings, providing an indication of their value in preventing corrosion. The device uses the attraction between a small permanent magnet and the plated sample. By turning the knob, the operator winds a helical spring which tends to detach the magnet from the plated surface. If the coating is less magnetic than the object plated the required force, indicated on a dial adjacent to the knob, will be greater for thinner coatings. For measurement of composite coatings the instrument is modified to include two magnets of different strengths. Values for the attractive force between the specimen and the two magnets are used, in conjunction with established data.



Foam rubber dunnage

CUSHIONS JET ENGINE SPARES

By S. H. Breslow
Assembly & Test Dept.
Aviation Gas Turbine Div.
Westinghouse Electric Corp.
Philadelphia

Molded foam rubber dunnage has cut costs for packing of jet engine spares at the Aviation Gas Turbine Div. of Westinghouse Electric Corp. Standard AN containers may now be used in place of previous heavier and more costly containers. Shock loads are evenly distributed. Special holding devices are eliminated.

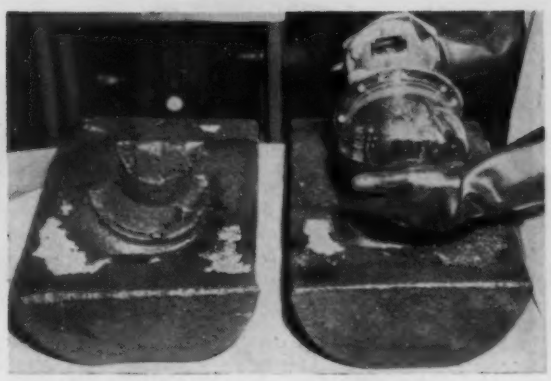
SPECIAL HANDLING was needed to package spare jet engine power takeoff gearbox under old method.

Use of molded foam rubber dunnage for packaging jet engine spares has reduced packaging costs, decreased weight and cubic displacement of containers, and is giving superior parts protection at Aviation Gas Turbine Div. of Westinghouse Electric Corp.

Jet engine spares must be protected from damage due to shock and moisture in shipment and storage. Previously a container with three or four rubber mounts attached to the inside base was used. The spare was secured to a brace set on the rubber mounts. Shock load was dissipated through the mounts into the container base, thence to the container walls. A very rugged, heavy, and costly container was required. A desiccant was placed in the container to absorb any moisture present.

Although the method was satisfactory, a less

SHOCK MOUNTED braces held gearbox. Shock load was dissipated through rubber mounts into container.



MOLDED FOAM rubber dunnage encases spare in cavity formed to exact contours of part to be shipped.

ASSEMBLY FITS snugly into AN container. Shock load is dissipated evenly through dunnage over container surface.

costly method which would also conserve weight, reduce cubic displacement, and give superior protection was sought. Molded foam rubber dunnage developed by Modern Dunnage Mfg. Co., of Philadelphia solved the problem. It is being used by defense contractors for packaging aircraft and gyro instruments, electronic tubes, and fire-control instruments.

The spare is encased in a molded rubber cavity formed to exact contours of the part. Shock load is dissipated through the dunnage and over the entire surface of the container. Container weight, and cost, is considerably reduced.

Large components use collars

With the previous method of shock mounting, a special container had to be made for each component. Rubber dunnage makes possible use of standard AN containers. Special handling and assembly are also eliminated from the packaging operation.

With large components it is not practical to completely encase the object, and a system of plugs and collars was adopted. A combustion liner is installed in the base of the can where the plug indexes the liner and the collar fits around the other end and is compressed by the lid. Adoption of this system resulted in a 50 pct reduction in weight, 18 pct reduction in cubic displacement and 33 pct reduction in cost over the previous method.

Method cuts packaging costs

Percentage cost reductions for packaging of typical parts with the new method are as follows: Exhaust collector, 12.7 pct; combustion chamber outer casing, 35.3 pct; combustion chamber, 24.6 pct; front bearing support, 33.9 pct; oil cooler, 48 pct; oil pump, 68 pct; bevel gear package, 34.1 pct.

Production of the molded foam rubber is similar to other casting operations. Drawings of the parts to be packaged are prepared, and, from these drawings, a pattern of the part is made. Steel and aluminum molds are made.

The molded dunnage is made in a minimum of two pieces, with the parting line positioned for most satisfactory use. Location of the part-

COMBUSTION LINER Slips easily into place.

MOLDED COLLAR holds bulky combustion liner snugly in place. Special fittings and brackets were formerly used.

LARGE, BULKY parts require several molded foam rubber fittings. Silica gel desiccant absorbs moistrue in container.

ing line, and position of the part in the dunnage is determined by the dunnage supplier, except when the part must be shipped in a particular position. All similar pieces of dunnage for a particular unit are interchangeable.

The molded cavity is so located in the dunnage that extreme points of the part to be packaged are not less than 1⅜ in. from any surface of the container. Overall height of the dunnage is such that minimum compression of the material when the container cover is bolted on is ¼ in., and no part of the dunnage compresses more than 25 pct of its thickness. The outside diameter of the dunnage is such that no independent movement of the part is possible.

Manufacture of the dunnage is controlled so that the pH value and SO_3 content are held to minimum allowable amounts as determined by the composition of the part to be packaged. Moisture content of the dunnage, part synthetic and part natural rubber, should not exceed 14 pct.

All surfaces of the dunnage are coated with a flexible, non-corrosive, non-abrasive sealing material that prevents particles of foam rubber from breaking loose, but does not reduce the cushioning properties of the dunnage. The vinyl seal is oil-resistant and prevents breakdown of the rubber.

A depression is provided in the dunnage for the required amount of desiccant, and channels permit circulation of air for dehumidification.

COAL ON THE MOVE

Jeffrey Belt Conveyors are used for long hauls—both horizontally and on the incline. Jeffrey Steel Apron Conveyors (left) for large capacities and short hauls. Both available in widths to suit requirements.

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Continued

Cast steel sprockets

Proper design and accurate casting, plus a large selection of carbon and alloy steels, permit a wide variety of cast steel sprockets for many requirements. The cast tooth steel sprockets described in a new catalog are made to withstand rugged use and assure smooth performance. *Farrell-Cheek Steel Co.*

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Gear reducers

Gears, speed reducers, flexible couplings and Limi-Torque valve controls are described in a new bulletin. Motoreducer is a self-contained drive unit with motor and planetary speed reducer in a single compact housing. It is available in horizontal or vertical types with speeds ranging from 420 to 16.5 rpm. *Philadelphia Gear Works, Inc.*

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Foundry equipment

Tabor Molding machines, a team of foundry equipment units designed to cut foundry costs, are described in a new 12-p. booklet. Included are jar squeeze machines in either stationary or portable types and jarring machines capable of ramming any mold within their capacity in 1 minute. *Tabor Mfg. Co.*

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Swiss automatics

History and development of Swiss automatic screw machines are told in a new 32-p. booklet. Precision possibilities of this type of machine are widely recognized. Features of the Bechler machines include long, sturdy slides of headstock and tool holders, simple tool adjustment, accessibility of cams, and wide range of accessories. *Cosa Corp.*

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Crane truck

A new 6-p. bulletin describes the Baker crane truck. Cutaway photos of component parts are used to make construction details easy to follow. Complete engineering specifications and drawings are included. *Baker-Raulang Co.*

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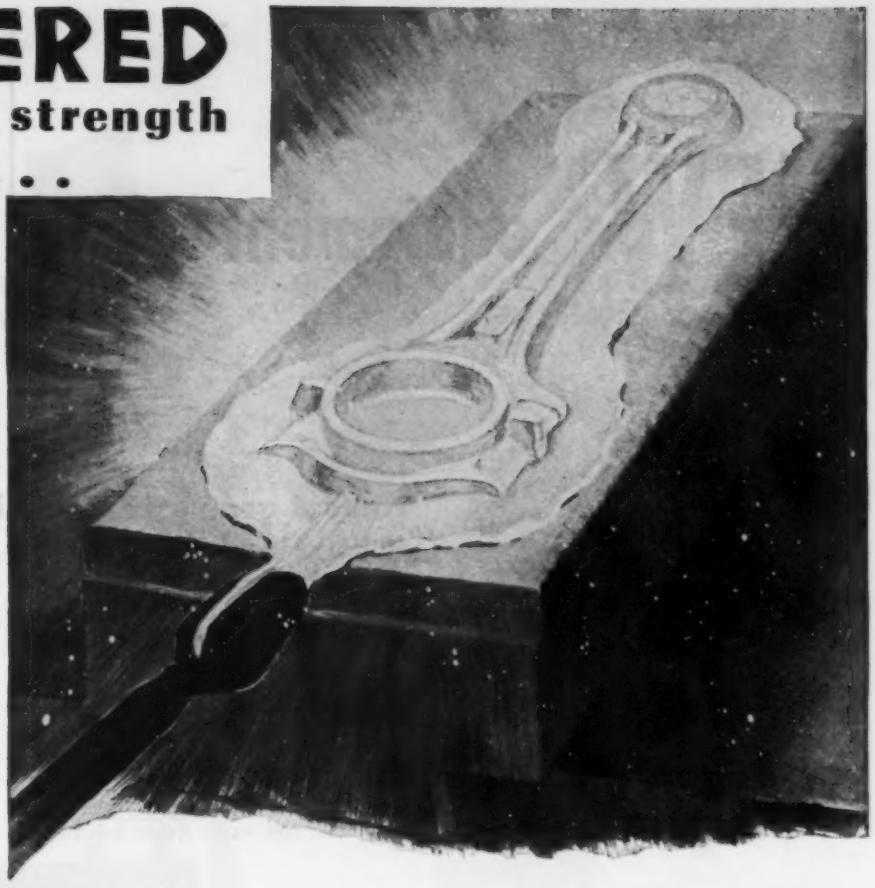

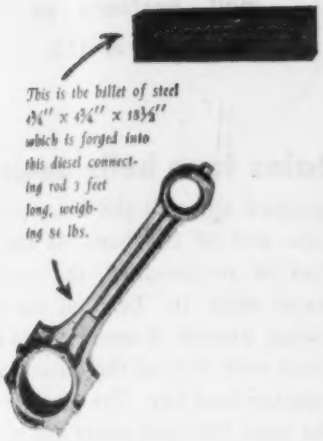

This is the billet of steel 4¾" x 4¾" x 18½" which is forged into this diesel connecting rod 3 feet long, weighing 84 lbs.

What a forging this diesel connecting rod is! Three feet in length (the average automobile engine's connecting rod is less than a foot long) weighing 84 pounds (against 4 pounds for the automobile connecting rod) it starts as a hot billet of steel 4-3/4 inches square by 18-1/2 inches long, which is hammered between two dies for seven different operations to form the completed forging shown.

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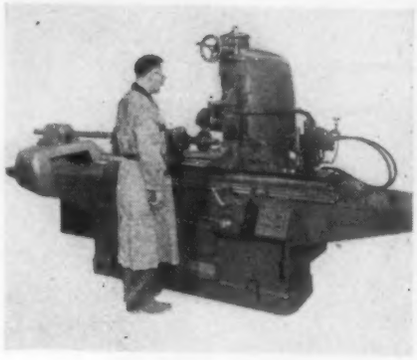
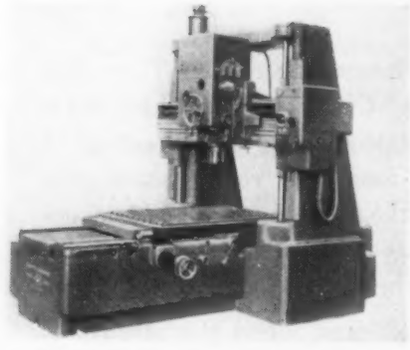


Helical gear grinder maintains true helix angle

To eliminate errors in grinding true helix angle or lead on helical gears, Red Ring engineers adopted the lead bar principle with certain refinements for the Model SGF helical grinder. An accurately ground master lead bar operates through a pressure lubricated self-tightening anti-backlash saddle nut, with the work drive headstock coupled through the index plate to one end of the bar. As the lead bar is reciprocated, the work rotates with it. Lead of the work being ground is accurate and identical with that of the direct coupled master lead bar. The machine may be used for spur gears and splines. *National Broach & Machine Co.*

For more data insert No. 20 on postcard, p. 159.



Viewing screens feature jig boring machines

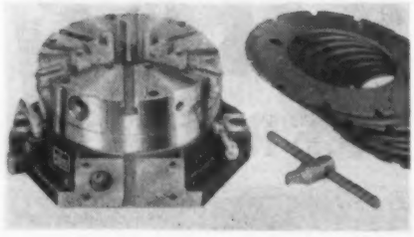
Important advance in design of large optically set SIP jig boring and milling machines, Hydroptic-7P and 8P, consists of built-in viewing screens. On these screens graduation lines of built-in scales are optically projected with a large magnification, substituted for the former microscope eyepieces. Screens are built into the bed and the crossrail; into the horizontal head on the 8P model. They have a rectangular surface illuminated by green light. In the field is a movable reticle in the form of a pair of beaks, positioned by a micrometer drum reading to 0.0001 in. Accurate settings can be made with naked eye. *American SIP Corp.*

For more data insert No. 21 on postcard, p. 159.

Welding machine simplifies production

Continuous welds up to 100 ft long can be made automatically with a new welding gantry built by the Manitowoc Shipbuilding Co. for work on ship sections and crane booms. It travels along 100 ft of track and has a traverse of 28 ft. Flexible control of the welding unit has solved problems resulting from the shape and size of parts to be welded. Vertical adjustment of the welding head permits welding at any level up to 6 ft above the work table. Simultaneous operation of bridge and carriage drives allows for diagonal welding at any angle. *Linde Air Products Co.*

For more data insert No. 22 on postcard, p. 159.

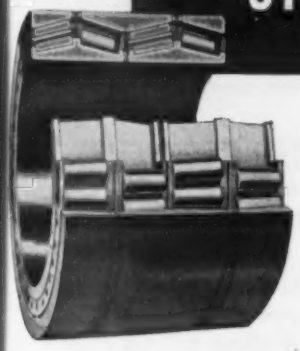


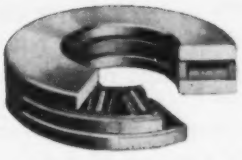
Tool provides fast, accurate indexing

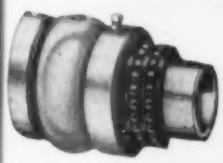
A 12-in. capacity Super Spacer eliminates expensive jigs and fixtures. It comes complete with 48-notch master index plate, a set of eight mask plates, and T-handle socket wrench. Turrets are graduated in degrees for use in setting odd spacing or for checking. The chuck is a combination faceplate and chuck. *Hartford Special Machinery Co.*

For more data insert No. 23 on postcard, p. 159.

Turn Page







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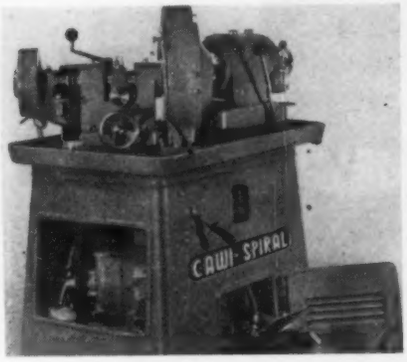
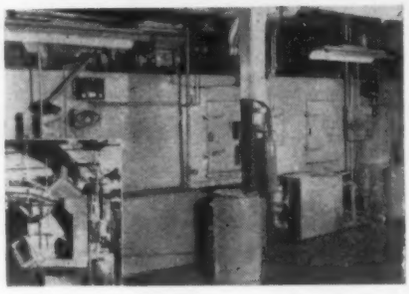


Twist drill grinder assures uniform drill lips

Two and three-lip twist drills from 0.078 to 1-in. diam can be ground consecutively in the new Cawi-Spiral machine to a high degree of accuracy. Key to the accuracy is a planetary drive gear system. For each revolution of the drive head, a two-lip drill makes 1½ revolutions on its own axis. For three-lip drills, the ratio is 1⅓:1. Cutting lips are thus ground in sequence each time the drill revolves in contact with the grinding wheel. True concentricity of the lips with the drill body axis is thus assured. The lips are ground exactly alike. Two chucks handle drills from 1/32-5/16 in. and 5/16-1 in. and are easily interchanged, in less than 1 min. They are opened and closed by a turn of the hand. *Kurt Orban Co., Inc.*

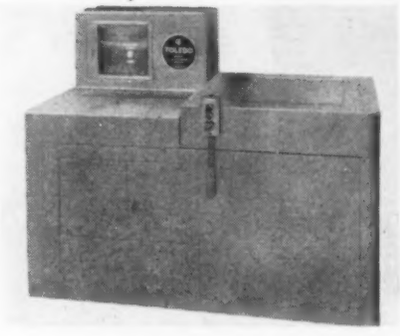
For more data insert No. 24 on postcard, p. 159.



Washing, metal treating machine has high capacity

Processing carbon steel wire frames and metal stampings at the Andrew B. Hendryx Co., an overhead monorail washer has the high capacity of 36 sq ft of work per min. Four operations performed automatically and in sequence are: Phosphatization, clear water rinse, chromic acid bath, and drying. These are said to impart to the work an excellent surface for spray painting, resulting in a longer painted life. Elimination of paint peeling and reduction of paint-fault rejects are other advantages. *Industrial Washing Machine Corp.*

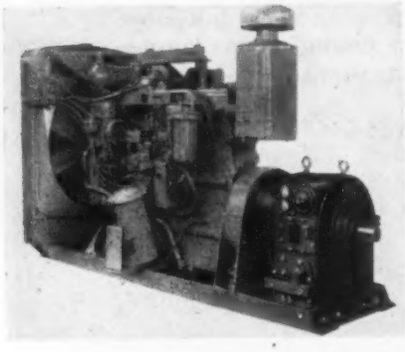
For more data insert No. 25 on postcard, p. 159.



Scale classifies, zones and checks weight

For plants that require high speed, accurate weighing and classification a new electronic dynamic classifier "weighs on the run." The scale is suited for check-weighing prefilled containers of material for underweights, overweights or both. It also classifies finished products into various weight groups or zones. The machine is custom built to meet specific requirements of the job. It handles weights in the 4 oz to 10 lb class, will weigh, classify, and zone containers into 8 different zones. Classification speeds are 60 to 100 per min depending on size of article. *Toledo Scale Co.*

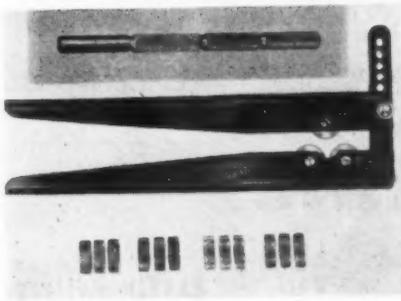
For more data insert No. 26 on postcard, p. 159.



Single-stage three-element torque converter

Combining a hydraulic torque converter and hydraulic coupling in a single unit, the Model 17-K single-stage, three-element type unit provides automatic transmission for shovels and cranes, rail cars, locomotives, material handling devices, etc. It can be used with gas or diesel engines rated up to 300 hp and is roller-bearing equipped to assure maximum life in heavy industrial service. Variable torque ratio is up to 3:1. Because the engine performs at a practically constant speed during the converter range, overload will not cause stalling. Major elements consist of the converter pump, converter turbine and reaction member. *Torcon Corp.*

For more data insert No. 27 on postcard, p. 159.



Hand operated knurler saves time

A hand operated knurler may be used with a lathe, drill press, or if no machine tools are available, the work can be held in a vise and the knurler rotated around it. The knurler is held in the hand, in the manner of a pair of pliers, eliminating setup operations. It does not require work to run dead true; it knurls concentric surfaces and surfaces that are off-center. Adjustable, it accommodates parts 5/32 to 2 in. diam, knurling any length desired. Surfaces may be machined after knurling. *M.P.A. Co.*

For more data insert No. 28 on postcard, p. 159.

Turn Page

To operate at spot welding forces up to 6000 pounds

New Mallory "*Premium*" 8° Heavy Duty Electrode Holders

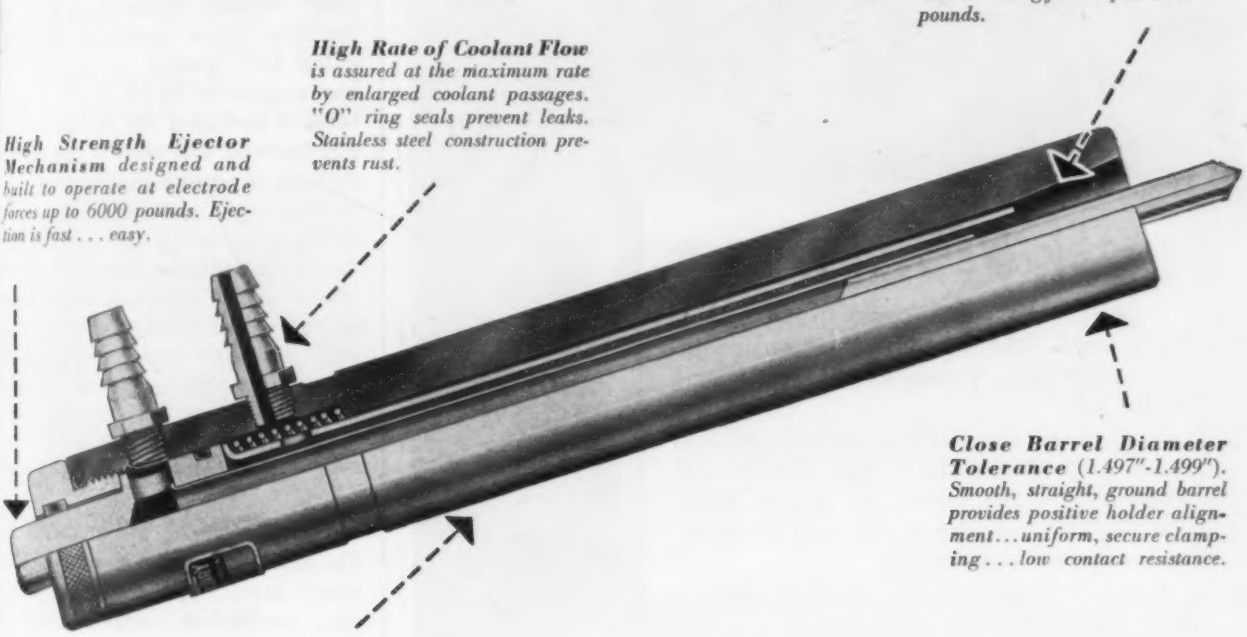
Latest addition to the widely-used Mallory line of leak-proof electrode holders, the new "Premium" heavy duty holders are designed to help you handle the higher electrode forces and welding currents required to meet the rigid specifications on military components.

Consider the special "Premium" features which help you get economical, dependable welding performance . . .

Easy Electrode Removal *is made possible—without lubrication—by the 8° taper of the electrode socket (4° per side) even at seating forces up to 6000 pounds.*

High Rate of Coolant Flow *is assured at the maximum rate by enlarged coolant passages. "O" ring seals prevent leaks. Stainless steel construction prevents rust.*

High Strength Ejector Mechanism *designed and built to operate at electrode forces up to 6000 pounds. Ejection is fast . . . easy.*



Close Barrel Diameter Tolerance *(1.497"-1.499"). Smooth, straight, ground barrel provides positive holder alignment . . . uniform, secure clamping . . . low contact resistance.*

Nickel Plated Barrel *protects against abrasion and corrosion with a pure, high quality nickel plating.*

Standard Mallory Fluted* Electrodes with 8° taper (4° per side) are available in a variety of sizes, shapes and alloys for use with "Premium" holders.

*Patent Pending

In Canada, made and sold by Johnson Matthey and Mallory, Ltd.
110 Industry St., Toronto 15, Ontario

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For information on titanium developments, contact Mallory-Sharon Titanium Corp., Niles, Ohio

BIG . . . or small

• It makes no difference if your load is big or small, light or heavy, rough or smooth. There is an ACCO *Registered* Wire Rope Sling for the job.

You can get standard Strand-Laid and Cable-Laid Slings from local distributors. Many others are carried in factory stock. The big ones and very special ones we design and make specially for you.

Every ACCO *Registered* Wire Rope Sling is proof-tested, identified with a metal tag, and warranted as to rated capacity. We eliminate the guesswork. See your distributor today or write for information.

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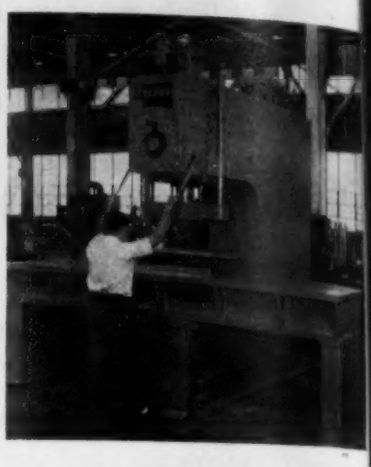
WIRE ROPE SLING DEPARTMENT
AMERICAN CHAIN & CABLE

TRADE MARK

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

ACCO Registered Wire Rope Slings



Double-duty press

A new Elmes C-frame hydraulic press recently installed in a large ordnance plant combines straightening and forcing operations. It has a capacity of 75 tons. A long table is provided for straightening gun barrels. The table is removable, making the press usable as a general-purpose straightening press; an opening in the bed provides for forcing operations. Dual hand lever is interlocked with the foot treadle, an important safety feature. The ram will not descend until both hand levers and foot treadle are depressed. *Elmes Engineering Div., American Steel Foundries.*

For more data insert No. 29 on postcard, p. 159.

Spare parts kits

To ease the problem of stocking spare parts for Life-Linestarters, kits containing complete sets of normal wearing parts are available. They contain replacement moving contacts, moving contact springs, and stationary contacts. Six different kits cover 2 and 3-pole starters in sizes N0, N1, and N2. *Westinghouse Electric Corp.*

For more data insert No. 30 on postcard, p. 159.

Heaters for ore cars

To solve a winter dumping problem a lacework of strip heaters installed under the floor of bottom dump ore-transfer cars manufactured by Atlas Car & Mfg. Co., keeps ore from freezing and sticking to the interior of the cars. The cars are used for filling bins on blast furnace high lines. The bar-

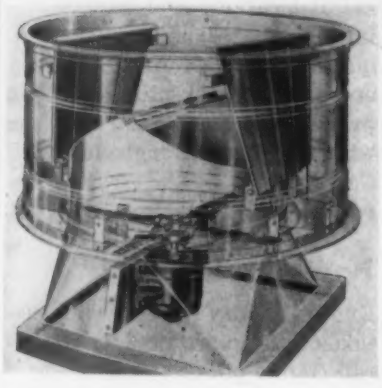
rage of heaters are clamped directly to the hopper plates in a manner that allows for expansion and contraction. Each group of heaters is connected to a fused safety switch at the control panel to facilitate maintenance. *General Electric Co.*

For more data insert No. 31 on postcard, p. 159.

Waterproof switches

Waterproof toggle switches developed to meet military specifications, open and close electrical circuits underwater, and are said to function perfectly from —65° to +165°. They withstand shock and vibration. Ratings are from 20 to 200 amp, in toggle arrangements of momentary on or off and stationary on or off. *Riverside Mfg. & Electrical Supply Co.*

For more data insert No. 32 on postcard, p. 159.



Power ventilator

Rapid localized removal of air contaminated with smoke, fumes, dust and heat is claimed for a new exhaust fan ventilator. The unit is powered by an axial flow fan direct connected to its motor. Air shaft extends above the fan and terminates in a pair of dampers that open and close automatically as the fan is turned on and off. Free opening of dampers allows an unrestricted volume of air to be driven vertically upward at high velocity by the fan. Seven sizes, with motors from ⅓ to 5 hp, provide capacities ranging from 5000 to 75,550 cfm. *Burt Mfg. Co.*

For more data insert No. 33 on postcard, p. 159.

Turn Page

an ACCO product
ACCO REGISTERED SLING CHAIN
REACH 10 FT. 6 IN.
SER. NO. 5 8 5 2 1
a Sign of Safety
• The identification ring you find on every ACCO Registered Sling Chain is your sign of safety. It's your guarantee of quality. It makes it easy for you to select the correct . . . safe . . . sling for each lift.
You can get ACCO Registered Sling Chains in the type, material, and size best suited for your work. No better sling chains are made. See your AMERICAN CHAIN distributor or write for Catalog DH-314.
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American Chain

Best way to keep a Head

Vapor-from-Paper STOPS RUST — Now Cost of Protecting Diesel Cylinder Heads is Cut from $4.70 to $1.31

You're looking at a revolutionary way to keep a Diesel cylinder head from rusting.

A leading locomotive firm used to dip heads in an inflammable cleansing liquid. Then moisture had to be removed. This called for cranes and fire precautions. Dried with an air hose, this cylinder head was dipped into a varnish-like solution. To keep the sticky coating in place, waxed paper and heavy wooden boxes were "musts". Unpacking involved the same troubles in reverse. A couple of hours with a scrubbing brush came before the head could be installed in a Diesel.

Today, vapor-from-paper stops rust! This magic-like paper is Angier VPI* Wrap. It gives off an invisible protective vapor that is clean . . . SAFE! As the vapor permeates into deepest cavities, both air and moisture are made harmless to shiny cylinder heads. No grease or oil is necessary. Now packaging costs are down to $1.31 from $4.70. And this doesn't include an average freight savings of 24% on the thousands of different locomotive parts that now are VPI-protected. All parts are ready to use when received . . . a godsend to men in the repair shops. No bulky equipment is required, so valuable floor space is saved.

If you ship or store metal parts or products, Angier VPI Wrap is meant for you! It may be used as a box liner or an envelope as well as a container insert. For "VPI Facts", write to the most experienced name in vapor rust preventives . . . Angier Corporation, Framingham 10, Mass.

Angier

VPI* WRAP

Sold Nationally Thru Distributors . . . Who Also Sell Angier Reinforced "Snake Tape"; "Iaduwrap" — the Original Grade A Greaseproof Barrier; the new Angier Glass Wrap, A-G-W and Other Protective Papers.

* ® Vapor Rust Preventive

—New Equipment—

Continued

Guide pin

New removable cap guide pins end punch holder binding in separating two and four post die sets. The punch holder is readily freed on the uppermost part of the pins where it is apt to tilt and bind. One man, by removing the guide pin caps, can part the die set alone with minimum effort in a few minutes. Cap is removed from the guide pin by loosening a socket head screw that holds it in place. *Superior Steel Products Corp.*

For more data insert No. 34 on postcard, p. 159.

Drilling unit

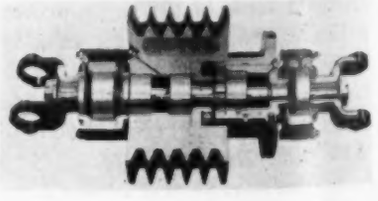
Long travel and skip stroke feature a new drilling unit suited to a wider than ordinary range of work. With a 4-in. working travel and a skip stroke attachment it is suitable for deep drilling, drilling in hard to get at locations, and accurate drilling in materials requiring frequent chip clearing. The unit operates in any position. Air feed provides uniform drill feed even when breaking through. *Black Drill Co., Inc.*

For more data insert No. 35 on postcard, p. 159.

Power take-off

Known as the Davey P-80, a new take-off is guaranteed to transmit full engine power to the driving of heavy duty truck-mounted equipment. It contains 12 less parts than its predecessor model and is 25 lb lighter. A vacuum shift control is offered as optional equipment. Take-off itself is identical for all trucks. Mounting parts for individual truck makes are maintained in stock at all times. Installation time has been reduced by 50 pct due to design simplification. *Davey Compressor Co.*

For more data insert No. 36 on postcard, p. 159.



Turn Page

Striking Campaign in

The Saturday Evening POST

continued for 1952 . . . users of Phillips Cross-Recessed-Head Screws reap the benefit

Once again readers of The SATURDAY EVENING POST are being told to look for the clue to quality: Phillips Cross-Recessed-Head Screws. Take advantage of this powerful promotion by assembling your products with these quickly identified fasteners. You save time, work, money because Phillips Screws . . . Wood, Machine, Tapping or "Sems" . . . start faster, eliminate driver skids, damaged parts, split screw heads. What's more, they add structural strength. Be sure to include the clue to quality in your specifications!

Can you find the clue...
...to quality? X marks the spot...
Yes! a PHILLIPS SCREW
PERFECTLY MATED!
Only Phillips Drivers are perfectly mated to Phillips Screws. Look for the name Phillips on the shank.

X marks the spot... the mark of extra quality

PHILLIPS *Cross-Recessed-Head* **SCREWS**

manufactured by

AMERICAN SCREW CO. • ATLANTIC SCREW WORKS, INC.
THE BLAKE & JOHNSON CO. • CAMCAR SCREW & MFG. CORP.
CENTRAL SCREW CO. • CONTINENTAL SCREW CO. • THE EAGLE LOCK CO.
ELCO TOOL AND SCREW CORP. • GREAT LAKES SCREW CORP.
THE H. M. HARPER CO. • ILLINOIS TOOL WORKS • THE LAMSON & SESSIONS CO.
NATIONAL LOCK CO. • NATIONAL SCREW & MFG. CO.
PARKER-KALON CORP. • PHEOLL MFG. CO.
ROCKFORD SCREW PRODUCTS CO. • SCOVILL MFG. CO.
THE SOUTHINGTON HDWE. MFG. CO. • STERLING BOLT CO.
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THE FASTENERS OF TODAY . . . AND OF THE FUTURE

HERE'S HELP!

to get
MORE PRODUCTION
at
LOWER COST
with your
PRESENT MANPOWER

PRECISION INSPECTION EQUIPMENT

- Quality control gages
- Indicating comparators
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- Multiple dimension production gages
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- Standard precision gages
- Special gaging equipment
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MORE PRODUCTIVE MACHINE TOOLS

- Gear burring, burnishing and chamfering machines
- Micro-Form grinders
- Crushtrue grinding equipment
- Thread and form grinders
- Threading machines
- Automatic welders
- Special machine tools

TIME-SAVING THREADING TOOLS

- Solid taps
- Collapsible taps
- Self-opening dieheads
- Thread chasers

CONTRACT SERVICES

- Engineering and design
- Dies of all sizes
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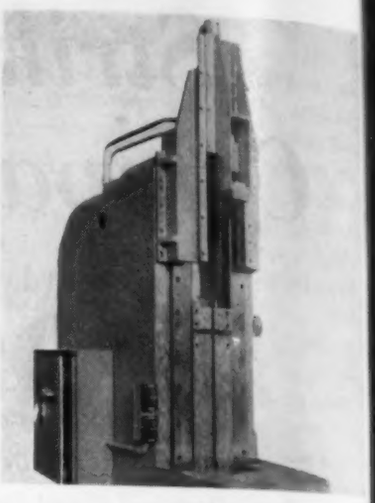
- Forms, threads, precision parts
- Special production machines

Call, wire or write for a qualified Sheffield engineer to help select equipment which best meets your expanded requirements. Address CUSTOMER CONSULTATION SERVICE.

the *Sheffield* corporation

Dayton 1, Ohio, U. S. A.

GAGES • MEASURING INSTRUMENTS • MACHINE TOOLS
CONTRACT SERVICES • THREADING TOOLS



Broach retriever

For use with American Broach's T-type three-way broaching machine a new style retriever has simplified design and sturdier construction, resulting in improved performance. It is more rigid under stress of operation; provides for easier servicing, and facilitates the handling of heavy broaches on pull down operations. *American Broach & Machine Co.*

For more data insert No. 37 on postcard, p. 159.

Die sets

Every contour of new die sets is planned to keep weight at a minimum while reinforcing all critical areas. One long, smoothly machined rear pad on the punch and die holder assures uniformly accurate location of pin and bushing holes. Straight rear pad allows considerably more layout and mounting area on the punch holder, as well as on the smaller die holders. All semi-steel die sets have uniform grain structure and extremely high tensile strength. *Producto Machine Co.*

For more data insert No. 38 on postcard, p. 159.

Medium duty trailer

New all steel trailers are suitable for handling bagged material or to carry one or more pallets loaded with bagged material. Smooth steel construction with rounded corners and edges prevents bags and other materials from being torn. Each end of trailer is

equipped with welded tubular racks which are removable. Loops on each side are for diagonal-type coupler rods. Capacity is 3000 lb; length, 69 in.; width, 36 in. Furnished with cushion rubber wheels. *Market Forge Co.*

For more data insert No. 39 on postcard, p. 159.

Lockerbasket

More efficient use of space, more light, better ventilation and economy of installation are outstanding features of an overhead lockerbasket. Lockerbaskets meet the needs of locker rooms. They are sturdy, rust resistant, will not tip; have 1200 cu in. of unobstructed basket space for storage of shoes, hat, packages and other articles. Garments are suspended back to back on hooks allowing free circulation of air. *Moore Co.*

For more data insert No. 40 on postcard, p. 159.

Electronic recorder

The electronic recorder incorporates the high speed and accuracy inherent in the electronically controlled null balancing system which utilizes specially adapted atcotran differential transformers built into the housing. This null system rotates the recorder chart drum in direct proportion to the strain or deformation of the specimen under test. The testing machine produces a stress coordinate by horizontal movement of the non-clog pen of the recorder. The instrument may be applied to testing machines for tension, compression, and transverse testing. *Tinius Olsen Testing Machine Co.*

For more data insert No. 41 on postcard, p. 159.

Turn Page

FREE

ASK FOR BOOKLET No. H-2

IF YOU PRODUCE PARTS THAT REQUIRE FINISHING OF ANY KIND

This 22-page booklet is guaranteed to open your eyes! It gives you the inside story of advanced barrel finishing as never told before!

In the last five years, barrel finishing has made rapid advances. Only those directly connected have been able to keep up. Only 30% of the nation's manufacturers are benefiting from the tremendous cost savings and improved finishes made possible by these advances.

Now is the time to investigate this labor-saving, cost-cutting method. ALMCO barrel finishing equipment has completely paid for itself in as little as two months! This is easy to understand. A single unit installation replaces from two to twelve men. Savings run as high as 95%.

"Advance Barrel Finishing" is the only mass deburring, grinding and finishing method where results are controlled. Amazing results are now possible on almost all types of parts from large castings to small intricate parts. Close tolerance parts can be finished with absolute uniformity to almost any desired micro-inch reading.

WRITE TODAY FOR YOUR *FREE* COPY

ALMCO Supersheen

AMERICA'S LARGEST MANUFACTURER OF ADVANCED BARREL FINISHING EQUIPMENT—MATERIALS AND COMPOUNDS

ALBERT LEA, MINNESOTA

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NORTHERN'S
Latest Bulletins

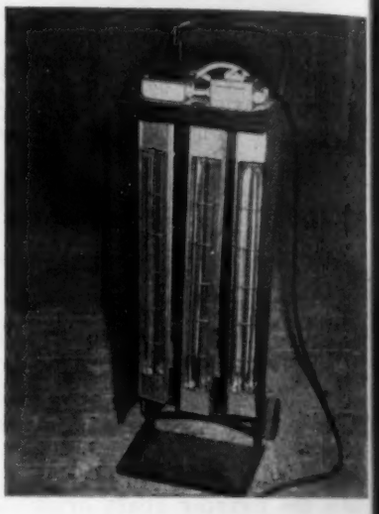
NORTHERN ENGINEERING WORKS
2615 ATWATER ST. DETROIT 7, MICHIGAN

—New Equipment—
Continued

Foundry flask pin

A non-binding flask pin is said to eliminate the necessity for excessive tolerances allowed on the common flask pin. There is no danger that the pin will seize or bind when cope is lifted from drag. It is a cylindrically wound steel spring with a tapered end, and an initial tension, coil to coil, of approximately 25 lb. Pins are furnished in standard diameters and various lengths. With this pin less skill is required to close and draw the mold. *Martin Engineering Co.*

For more data insert No. 42 on postcard, p. 159.



Portable radiant heat

For keeping men warm in hard-to-heat places, both indoors and out, a new Chromalox electric radiant comfort heater has been proving effective. The unit is portable. Typical outdoors applications include use at truck and boxcar loading, receiving and shipping desk work, watchmen's houses, and some maintenance jobs. *Edwin L. Wiegand Co.*

For more data insert No. 43 on postcard, p. 159.

Thermo insulator body

For use in applications where extreme thermal shock and heat resistance is encountered, an improved thermocouple insulator body, the Saxonburg Thermo Body, is manufactured in all standard and special sizes (over 300 shapes and sizes). *Saxonburg Potteries.*

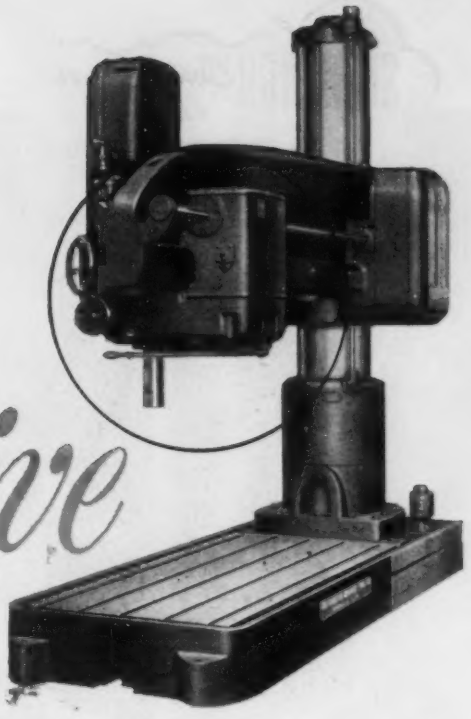
For more data insert No. 44 on postcard, p. 159.

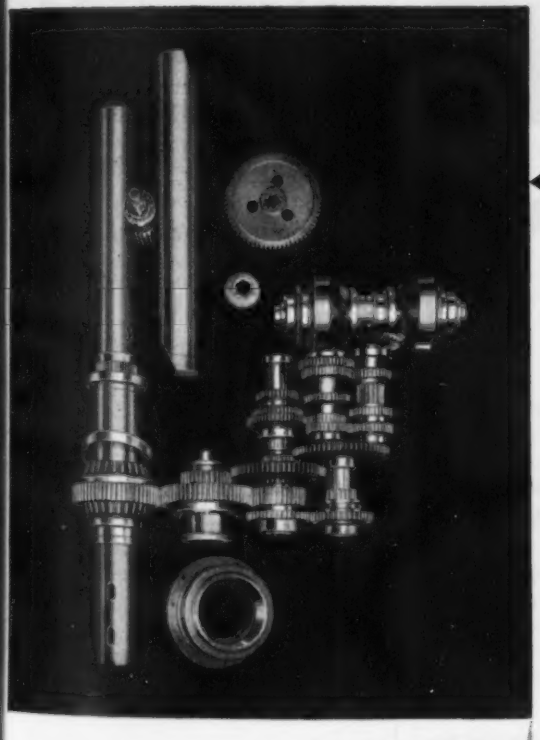
Turn Page

comparison proves Carlton's

low hung drive

is without comparison





the main drive gear in all Carlton Radial Drills is placed in the *lowest part of the head.*

It drives on the *largest diameter* of the spindle, *closest to the cutting tool* . . . a principle well established by its wide use in planers, lathes and milling machines.

When you compare other radial drill driving mechanisms with Carlton's Low Hung Drive, you'll see why the overwhelming preference is for Carlton.

Thanks to the Low Hung Drive, Carlton can use an extra large spindle. And since the drive is always applied on the largest diameter of the spindle, it minimizes spindle twist . . . permits the use of higher speeds and greater feeds.

This principle—together with all ball bearing construction, low, centralized push button controls, modern lubrication, power clamping of arm, head and column, and Carlton's many other advantages—means increased "hole" production for you.

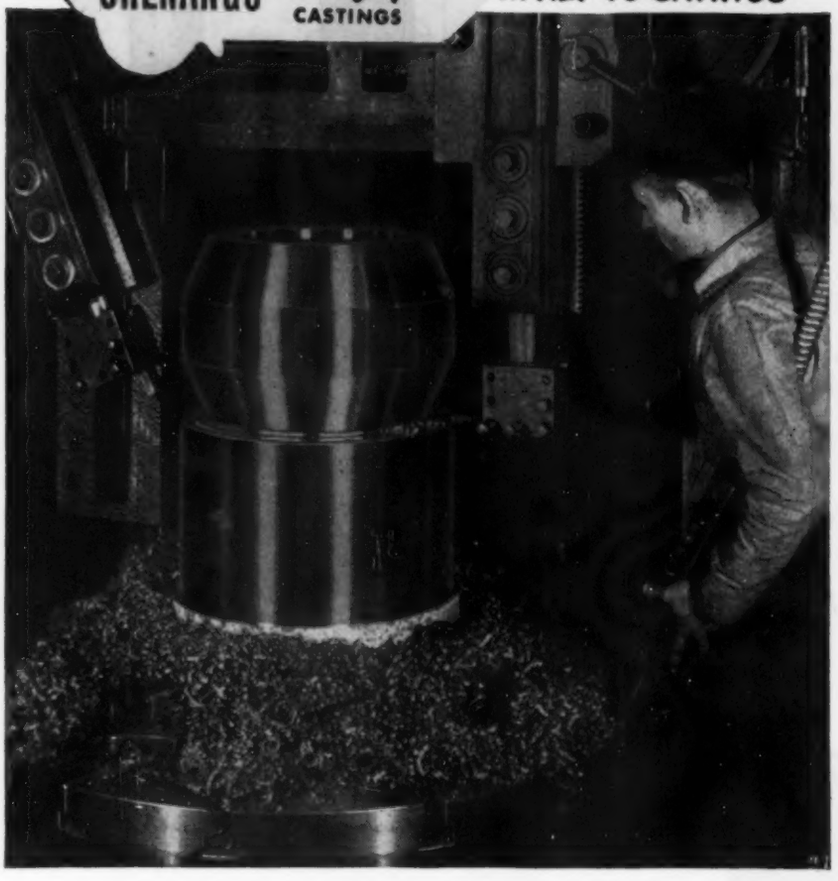
Why not write us today for bulletins describing the Carlton Radial Drills you need?

Carlton

THE CARLTON MACHINE TOOL CO.

THE CARLTON MACHINE TOOL CO., CINCINNATI 25, OHIO

SHENANGO Centrifugal CASTINGS ... KEY TO SAVINGS



How to save time and money on symmetrical parts!

YOU are in line for a double advantage when you turn to Shenango for symmetrical, tubular or annular parts, large or small.

First, such parts are produced by Shenango's advanced centrifugal casting process. This means *tougher* parts because of finer, pressure-dense grain, greater strength, better elongation and freedom from sand inclusions, blow holes and other often hidden defects. It also means less waste, less machining.

Second, Shenango has the modern machining facilities and skilled workmanship to give you semi-machined or finished parts... precisely as specified... at minimum cost! The heavy trunnion bearing shown above is one of the many types of parts, large and small, ferrous and non-ferrous, regularly produced at Shenango.

FREE BULLETINS

Find out if Shenango can help you save time, money and material. Bulletin No. 150 covers non-ferrous centrifugally cast parts; Bulletin No. 151 for parts of Meehanite Metal and Ni-Resist. Either or both are yours for the asking.

SHENANGO-PENN MOLD COMPANY
Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO

ALL RED BRONZES • MANGANESE BRONZES • ALUMINUM BRONZES
MONEL METAL • NI-RESIST • MEEHANITE® METAL

Acid safety goggle

Named Duo-Chem, a new acid safety goggle features a bright yellow vinyl frame, the ASA color code for acids, affording quick visual identification as an acid goggle. Light weight and genuine comfort are claimed for the velvet soft vinyl frames and vinyl optical plastic lens. Frame molds in a tight seal to facial contours. Metal hoods over screen vents offer safe, adequate ventilation. Lens is replaceable, optically correct, and meets Federal Specifications for impact resistance. *U. S. Safety Service Co.*

For more data insert No. 45 on postcard, p. 159.

High pressure springs

New high pressure springs have been designed for die application and general machinery use. The drawn, high carbon, oval wire permits a deflection of about 30 pct where maximum load rate and normal movement are required. Springs work in hole diameters from ¾ to 2 in.; over rod from 21/64 to 15/16 in. Free lengths are cut to exactly 1½ to 12 in. with ends closed and ground square. They withstand maximum pressure from 400 to 2000 lb. *Producto Machine Co.*

For more data insert No. 46 on postcard, p. 159.

Paint roller

For large area coverage on walls, ceilings, floors and structural steel work, an industrial paint roller permits painting of surfaces from a standing position on the floor. The roller is genuine lambswool, works with all paints, attaches to any extra long pole. Flip lock makes roller instantly interchangeable. *American Products Co.*

For more data insert No. 47 on postcard, p. 159.

Compact pump

Magna-Mite, a low-priced positive displacement pump of compact size, has rolling vanes. With a capacity from 1½ gpm down to ¼ gpm or less, this pump handles fuel oil, gasoline, hydraulic fluids, lubricating oils and other light viscosity fluids. Rolling friction replaces

sliding friction between the vanes and the pressure chamber, increasing life of the pump. Pump can be furnished for constant, adjustable or reversible displacement. It is cylindrical in shape and may be mounted integral. *Milwaukee Hydropower, Inc.*

For more data insert No. 48 on postcard, p. 159.

Work gloves

Long-wearing all-purpose work gloves have special coating that sheds moisture and resists chemicals. The vinyl-plastic coating stays flexible in extreme cold, does not become tacky at high temperature and is effective in combating strong acid concentrations. Tailoring assures comfort and utility. Gloves are available in fully coated or in ventilated palm-coated styles, with smooth or rough finish, with knit, safety, or gauntlet cuff. *Mine Safety Appliances Co.*

For more data insert No. 49 on postcard, p. 159.

Overload release

Instant and positive protection for driven machines, motors and the Dodge torque-arm speed reducer is provided by an overload release. It prevents breakdowns, avoids expensive repairs, and insures against interruptions of production resulting from an excessive load on the equipment. The release operates mechanically and electrically to loosen the belts, cut off the current, activate a warning bell, siren or light. *Dodge Mfg. Co.*

For more data insert No. 50 on postcard, p. 159.

Constant torque locknut

The Con-Torq precision built locknut affords a concentrated spring action of such power that when applied to a bolt or screw, the nut is said to defy vibration, moisture, extremes of heat or cold, or any other condition, to shake it loose. The nut is metal, one-piece construction; requires no other locking device; will not injure screw threads; is lightweight; locks securely in any position of the screw; and retains its original locking grip after countless removals. *E. A. Bessom Corp.*

For more data insert No. 51 on postcard, p. 159.

"No Use Going Out There
...THEY BURNED OUT LAST NIGHT!"

BAD NEWS for employees and the community. Bad news for management, too—especially if it has to explain why the fire protection it provided was too little or the wrong kind!

Too many bad fires result from not recognizing one thing: *not all fires are alike.* In most plants there are key operations where crippling fire can hit hard and fast. For these, ordinary fire protection is often hopelessly inadequate.

CARDOX originated "Low Pressure Carbon Dioxide Systems"* years ago to make extra-dangerous hazards safe. Applying CARDOX CO_2 tons-a-minute as readily as a few pounds, these Systems for one or many hazards keep small fires *small* and sudden big fires from becoming disasters. They hold fire damage to a minimum—and eliminate extinguishment damage entirely!

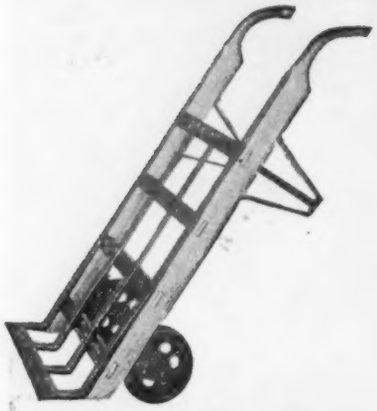
You'd be surer of uninterrupted production with this kind of protection in your plant. A survey by CARDOX—backed by the experience of thousands of installations and an unequalled knowledge of low pressure CO_2—will show you how easily you can write off fire as a major threat.

We'll arrange a survey if you'll kindly write us.

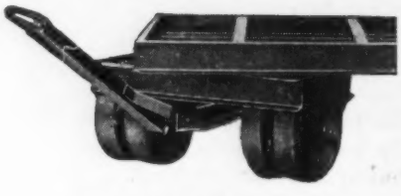
*Covered by Patents Issued & Pending

CARDOX
ORIGINATOR OF Low Pressure CO_2
FIRE EXTINGUISHING SYSTEMS

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS
Offices in Principal Cities



Trucks and Trailers



up to 50 ton capacity

Built with 80 years of skill by pioneers in the industry. Over a hundred standard two, four, and fifth wheel trucks and trailers. Special units designed and built to your specification. Complete engineering service.

WRITE FOR CATALOG

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Firm_____

Street_____

City & State_____

THE KILBOURNE & JACOBS MFG. CO.

794 Congress St., Columbus 16, O.

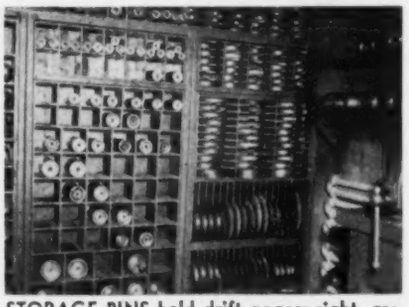
—Technical Briefs—

Gages:

Tube products plant protects gages with good housekeeping.

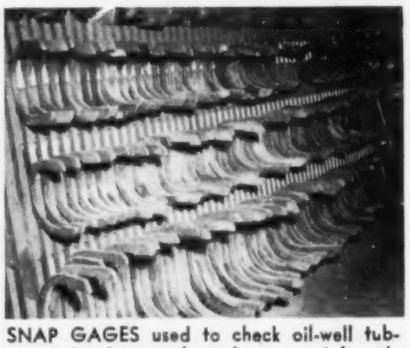
Care of the more than 2500 gages used for checking accuracy of tubing products produced by the Spang-Chalfant Div. of National Supply Co. has been simplified through use of specially-designed storage cabinets.

Master gages, regularly certified by an outside testing agency, are carefully protected against corrosion and stored in metal cabinets. When a working gage is to be checked against a master both are stored in the same cabinet for at least 24 hours so their temperatures will be the same.



STORAGE BINS hold drift gages; right, are ring gages for checking OD of tube products.

MASTER GAGES are regularly checked by U. S. Bureau of Standards.



SNAP GAGES used to check oil-well tubing and other products have special rack.

Turn to Page 180

ATLANTA, Georgia
Morrison-Drabner Steel Co., Inc.
82-84 Milton Ave., Alpine 4885

BALTIMORE, Maryland
Hill-Chase Steel Company of Maryland
6311 Erdman Ave., Peabody 7300
Asheboro, N.C.: Phone 8849
Richmond, Va.: Phone 7-4573

BEAUMONT, Texas
Standard Brass & Mfg. Co.
705 Milam St., Phone 4-2641

CHICAGO, Metropolitan Area
Korhumel, Heffron & Preiss Steel Co.
2424 Oakton St., Evanston, Ill.
Ambassador 2-6700

CINCINNATI, Ohio
Morrison-Drabner Steel Co., Inc.
1074-1084 Summer St., Wabash 4480, 4481

CLEVELAND, Ohio
Nottingham Steel Company
W. 45th St. & Division Ave., Atlantic 3100
Copper & Brass Sales, Inc.
7711 Grand Ave., Endicott 1-6757

DALLAS, Texas
Delta Metals, Inc.
3201 Oak Lane Street, Hunter 7446

DAVENPORT, Iowa
Nichols Wire & Aluminum Co.
1725 Rockingham Rd., Phone 3-1895

DETROIT, Michigan
Cauhorn Distributing Company
9999 Broadstreet, Texas 4-7000
Copper & Brass Sales, Inc.
3000 E. Woodbridge, Lorain 7-3380

HONOLULU, T. H.
Permanente Cement Co.
Pier 32, P. O. Box 79, Phone 5-2541

HOUSTON, Texas
Standard Brass & Mfg. Co.
2020 Franklin Ave., Preston 1123

INDIANAPOLIS, Indiana
F. H. Langsenkamp Company
229 E. South St., Riley 9311

KANSAS CITY, Missouri
Industrial Metals, Inc.
410 Southwest Blvd., Victor 1041

LOS ANGELES, California
Eureka Metal Supply Company
551 E. Macy St., Mutual 7286
Earle M. Jorgensen Co.
10650 S. Alameda, Lucas 0281
Reliance Steel Company
2068 E. 37th St., Adams 6133

MILWAUKEE, Wisconsin
KHP Milwaukee Steel Company
4600 W. Mitchell St., Evergreen 4-6000

MINNEAPOLIS, Minnesota
Korhumel, Heffron & Preiss Steel Co.
3225 S.E. Como Avenue
Gladstone 5943, Prior 4030

NEW ORLEANS, Louisiana
Orleans Steel Products Co., Inc.
1019-1025 Bienville St., Raymond 2114
Standard Brass & Mfg. Co.
2309 Tulane Ave., Aud. 1353

NEW YORK, Metropolitan Area
A. R. Purdy Co., Inc.
Page Ave. & Orient Way, Lyndhurst, N. J.
Lyndhurst: Rutherford 2-8100
New York: Chelsea 3-4455
Newark: Humboldt 2-5566

OAKLAND, California
Gilmore Steel & Supply Company
1960 Cypress, Glencourt 1-1680
Earle M. Jorgensen Co.
1657 W. Grand Ave., Higate 4-2030

OMAHA, Nebraska
Gate City Steel Works
11th & Seward Sts., Atlantic 1830

ORLANDO, Florida
Profile Supply Company
P. O. Box 2049, 1601 Atlantic Ave.
Phone 7124

PHILADELPHIA, Pennsylvania
Hill-Chase & Company, Inc.
Trenton Ave. & Ontario, Delaware 6-5400
Allentown: Allentown 28077
York: York 5790

PHOENIX, Arizona
Arizona Hardware Co., Inc.
First & Jackson Sts., Phone 8-5331

PORT ARTHUR, Texas
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KCS & Fourth St., Phone 5-9377

PORTLAND, Oregon
Eagle Metals Company
2336 N. Randolph, Tuxedo 5201

SAN FRANCISCO, California
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840 Brannan St., Klondike 2-0511

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SHREVEPORT, Louisiana
Standard Brass & Mfg. Co.
1557 Texas Ave., Phone 2-9483

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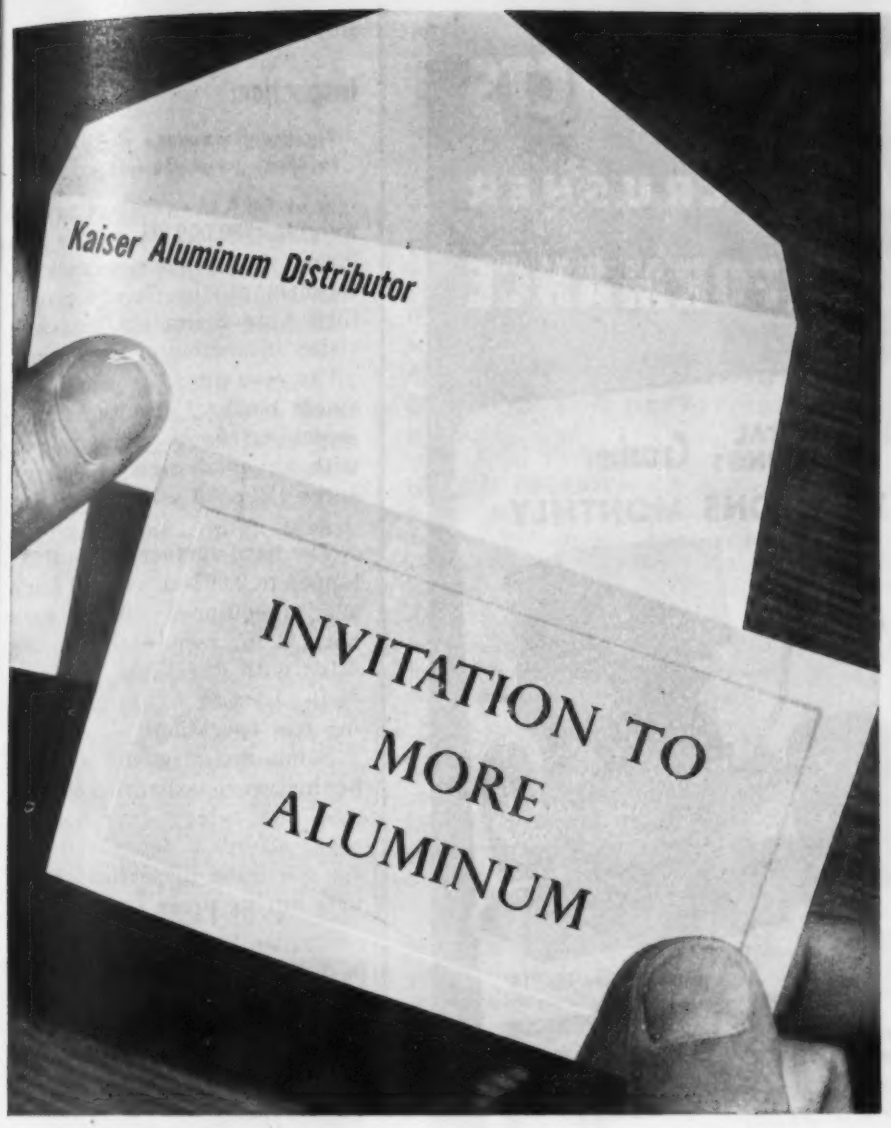
E. 320 Trent Ave., Madison 2419

WICHITA, Kansas
General Metals Incorporated
130-140 North Oak, Phone 7-1208, 7-1209



ONE of the best ways to make sure you get this invitation is to know, and to keep in touch with, your Kaiser Aluminum Distributor. For, sooner than you think, he may be able to increase your share.

Kaiser Aluminum is now building facilities which will increase its pre-Korea production of primary aluminum by 132%.

To handle this increased production, your Kaiser Aluminum Distributor is rapidly expanding his warehouse capacity and adding to his equipment. So in the coming days of ample supplies, his service will be more outstanding than ever before.

Meanwhile, it will pay you to take advantage of his willingness to assist you in every possible way in obtaining defense orders, and the aluminum to fill them.

He can help you properly specify the exact type of aluminum your product requires. He can suggest methods of using aluminum more economically, advise you of future availabilities, supply experimental quantities, meet emergency needs. Often, he can suggest ways to convert to more available forms.

Get to know your Kaiser Aluminum Distributor better and work closely with him. Find his name and phone number in the list at the left and call him *today*.

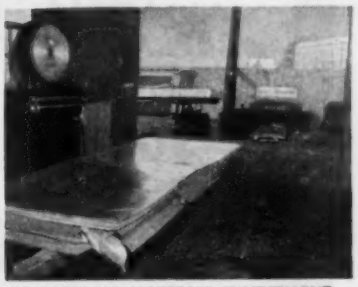
Your nearest Kaiser Aluminum Distributor is listed at the left. Call him TODAY.

Kaiser Aluminum

Setting the pace . . . through quality and service

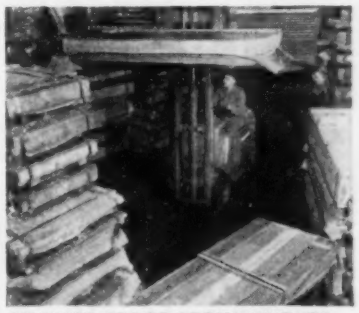
HERE'S HOW INVENTORY PROGRAMMING HELPS YOU:

MORE VERSATILE INVENTORY—Warehouse stocks give you the opportunity to select from a complete range of alloys and forms, slit, sheared, or sawed to fit every production demand.



LOWER RAW MATERIAL INVESTMENT—Daily delivery eliminates tying up your dollars in idle or obsolete inventory; improves your current capital position.

LOWER COSTS—Specialization of warehouse plant and handling equipment permits deliveries at lower cost at machine side, cuts stock keeping and accounting costs.



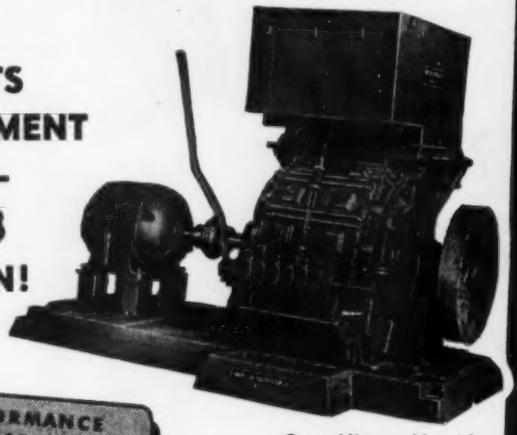
SMALLER SPACE REQUIREMENTS—Space necessary to house your average raw material inventory can be devoted to production. Becomes a source of income rather than an expense.

More "CRUSHING" FACTS ON American CRUSHER PERFORMANCE

American METAL TURNINGS Crusher

AVERAGES 1000 TONS MONTHLY

. . . PARTS REPLACEMENT COST— $0.03 PER TON!



PERFORMANCE DATA — Case History No. 14

PROBLEM: To reduce machine turnings to shoveling chips.
INSTALLATION: American Metal Turnings Crusher #3800.
AGE: 6 years in operation.
TONNAGE: Average 1000 Tons Per Month
TOTAL PARTS TO DATE: $2,028.30.
PARTS COST PER TON: $0.03

This performance record of a well-known Detroit manufacturer is familiar to other American Crusher owners, who have long since learned that there are 3 significant profit sources in every American installation: (1) American-reduced chips bring $4 more per ton in the scrap market, (2) Chips release up to 50 gallons per ton in recovered cutting oil, (3) Chips require less storage space . . . are easier to handle.

WRITE for Metal Turnings Crusher Bulletin

American PULVERIZER COMPANY

Designers and Manufacturers of Rima Crushers and Pulverizers

1439 MACKLIND AVENUE • ST. LOUIS 10, MISSOURI

—Technical Briefs—

Inspection:

Big granite surface plate used to check large stampings . . .

A granite inspection table weighing 50,000 lb, said to be the largest in existence, was installed recently at the Toledo plant of City Auto Stamping Co. for precision inspection of stampings.

The equipment consists of a single block of granite having no seams or flaws. The stone, cut with an overhanging ledge, measures 192 x 96 x 32 in.

The hard surface of the plate is lapped to 0.002-in. over-all flatness and is equipped with 20 drilled holes 2 in. deep, each hole being fitted with metal lugs threaded to ½-in. diam to secure objects during test operations.

Being non-magnetic and proof against warp, expansion or shrinkage, the table's true horizontal plane affords a dependable means for accurate inspection of products during press runs.

ONE-PIECE GRANITE surface plate weighs 50,000 lb, measures 196 x 96 x 32 in.

It is installed on a 32-in. concrete foundation and rests on three rubber cushions placed between the foundation and stone itself.

Nodular Iron Standards

Specifications covering physical properties of nodular iron have been formulated by the American Society for Testing Materials. The specifications are designed to aid industry in the purchase of nodular iron products. Copies of the standards (A 339-51T) may be obtained from ASTM at 1916 Race St., Philadelphia 3, Pa., for 25¢.

Finishing:

New abrasion resistant coatings for aluminum do not chip, flake.

Long wearing, hard, anodic, oxide coatings for use on aluminum where high resistance to abrasion is needed have been made available to licensees by the Aluminum Co. of America.

Alcoa has also acquired the U.S. patent rights to the Martin Hard Coating for aluminum from The Glenn L. Martin Co., Baltimore. The MHC finish is similar to the Alumilite coatings in hardness and structure.

MHC finish has been used successfully in the solution of problems of wear, abrasion, heat erosion, and corrosion in aircraft gears and pinions, turbine impeller blades, nozzles, the loading edges of high-speed airfoils, and leg braces for paraplegics. In a number of applications the finish has permitted aluminum-for-steel substitutions which have cut weight and operating costs. The harder finish gave additional wear resistance to the aluminum parts.

Dry Batteries Last Longer

Dry batteries that last twice as long as standard batteries have been developed by the U. S. Signal Corp. Secret is a new method of converting low-grade domestic manganese dioxide into a high quality product which is twice as effective as the natural imported material.

Even though the improved manganese dioxide is presently a little more costly than the natural, battery requirements could ultimately be cut in half—with great resulting economies.

The development of improved manganese dioxide is the result of cooperation between laboratories of educational institutions, private industry, and the military.

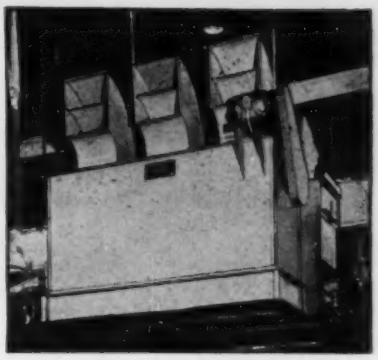
Contracts were placed with the research institutes of two universities to study physical properties and methods of improving the quality of manganese dioxide from domestic sources.

Turn to Page 182

New HIGH PRESSURE STEAM Fan Heater

Gives Savings You Never Had Before

The first heater to make High Pressure Steam really trouble-free and practical in plant heating. Every engineer should understand its original method; write for Niagara Bulletin and performance data.



HOW IT OPERATES: — A dual coil system makes use of all heat, both sensible and latent. High pressure steam enters the upper coil, shown on the diagram below. Its condensate drains into a trap. Then this high pressure condensate is released into the header of the lower coil. It instantly flashes into steam at vapor pressure.

Any high pressure condensate that remains liquid is carried to the vapor condensate return header by a drain tube that also gives off its heat into the air stream.

The vapor condenses in the lower coil. Its condensate is kept at a high level in the return leg by a wier in the return header so that all its heat is made useful and it is sub-cooled by contact with the coldest air entering the heater. Vacuum condensate return to boiler is vapor free.

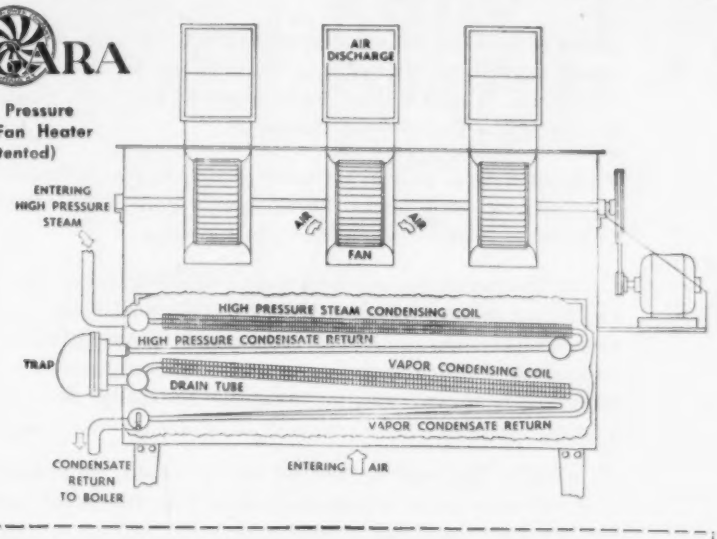
HOW IT SAVES IN COST: — Piping is much simpler and less costly than in low pressure systems. Much secondary piping, traps and big valves are not needed. Pipe sizes are smaller.

HOW IT SAVES IN OPERATION: — Waste is prevented. Every BTU goes where you want it. No dump traps or hot wells waste live steam.

HOW IT SAVES IN UPKEEP: — Condensate flow is even, vapor free, easily handled. No sudden surges of condensate in starting. No hammering, no hard wear and tear on system. Properly engineered for the job, final air temperatures are not excessive; heat easily directed where needed; no flashing of low pressure condensate. Heaters are self-draining on shut-down. Heaters are strongly built; all coils including the condensate drain tubes are hairpin bend, stress relieving. Use thru four heating seasons has proven these advantages in large scale plant heating.

NIAGARA

High Pressure Steam Fan Heater (Patented)



NIAGARA BLOWER COMPANY

Dept. IA 405 LEXINGTON AVE., NEW YORK 17, N. Y.

Please send Bulletin 109 on the Niagara High Pressure Steam Fan Heater.

Name .....

Address .....

You're looking at a polished section cut from a Duraspun Centrifugal Casting...a casting with 12-14% chromium. It tells better than words of the high quality of Duraspun Centrifugal Castings.

You get a fine, dense, uniform grain structure. Possible air pockets and blow holes are eliminated. Tensile strength is higher than with static castings.

Order Duraspun if you need pipe or tubing. Sizes run up to 15 feet in length; up to 32 inches OD; and down to ¼ inch wall thickness. Odd shaped pieces can be produced providing a circular hole passes uniformly down the center. These, of course, require specially designed casting forms.

If, before ordering or asking us to quote, you would like to know more about our work and facilities, send for our Catalog 3150.

THE DURALOY COMPANY

Office and Plant: Scottdale, Pa. • Eastern Office: 12 East 41st Street, New York 17, N.Y.

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Atlanta: J. M. TULL Metal & Supply Co. Chicago: F. O. NELSON 332 S. Michigan Avenue San Francisco: JOHN D. FENSTERMACHER 1241 Taylor Street

METAL GOODS CORP. Dallas • Denver • Houston • Kansas City • New Orleans • St. Louis • Tulsa

—Technical Briefs—

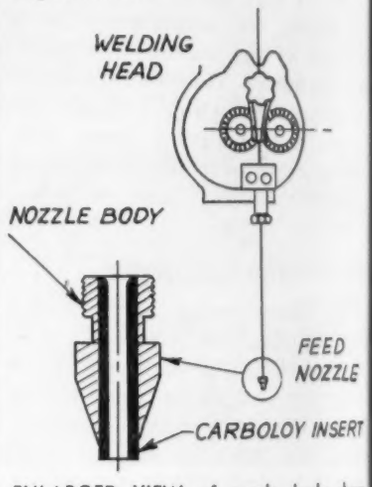
Arcwelding:

Carbide bushings in feed nozzle tips extend life, reduce burning.

Cemented carbide bushings inside the conventional feed nozzle tip for automatic arcwelding have increased life of nozzle tips up to 20 times and reduced burning effect, it is claimed.

In one case where the coiled electrode wire is especially abrasive, brass nozzles were replaced 6 to 8 times per week. Carbide portected nozzles are reported giving a service life of 3 months and better.

On operations where former life had not exceeded 3 weeks, nozzles are lasting as long as a year. A more uniform narrow weld can now be maintained, as accurate guidance of the wire is no longer a problem.



ENLARGED VIEW of nozzle body showing placing of carbide insert. Wire feeds through center hole.

A carbide guide ring—added inside the fibre guide which keeps the electrode wire from riding off the overhead pulley—eliminates danger of short-circuits from wire wearing through the fibre insulation and coming into contact with the metal support arm.

When wear occurs at the guide block which locks the electrode wire against the feed rolls, positive feeding is impaired. To eliminate this condition the guide block is now tipped with a standard Carboloy carbide blank. The face of the blank is ground to provide a slight radius.

Fluorspar:

Pellets made by mixing water, organic binder are successful.

Fluorspar pellets meeting metallurgical requirements have been successfully produced by mixing with water and organic binders, according to a report by the Bureau of Mines, U. S. Dept. of the Interior.

Used chiefly in steel production, the supply of coarse domestic fluorspar is rapidly being depleted. Because of the growing scarcity of the "gravel spar" it is believed use of metallurgical-grade flotation concentrates will be necessary. Because the proportion of fines must be kept low, pelletizing will be required.

Satisfactory pellets were produced by mixing fluorspar with about 12.5 pct of water, by weight, and 4 pct organic binders derived from the petroleum and woodpulp industries, the report stated.

Details of the physical characteristics of pellets made from several different binders are contained in the report **"Nodulization and Pelletization of Fluorite Flotation Concentrates."**

Rockets:

Simple designs give best results. . . . Gain valuable research data.

Simplicity of design has a direct bearing on the reliability of rockets, according to Dr. R. W. Porter, director of the General Eelectric-U. S. Army Ordnance guided missile project.

Of 68 V-2 test firings made at White Sands, N. M., between April 1946 and July 1951, there were 36 unsuccessful firings. For six of these the exact fault and sequence of events is known. For 14 rounds analysis showed what happened but not why. For the balance only the general area of trouble is known.

Through use of the rockets extensive data has been collected on aerodynamics, atmospheric conditions, ionization, radiation, the earth's magnetic field, parachute design, meteors, photography at extreme altitudes and television.

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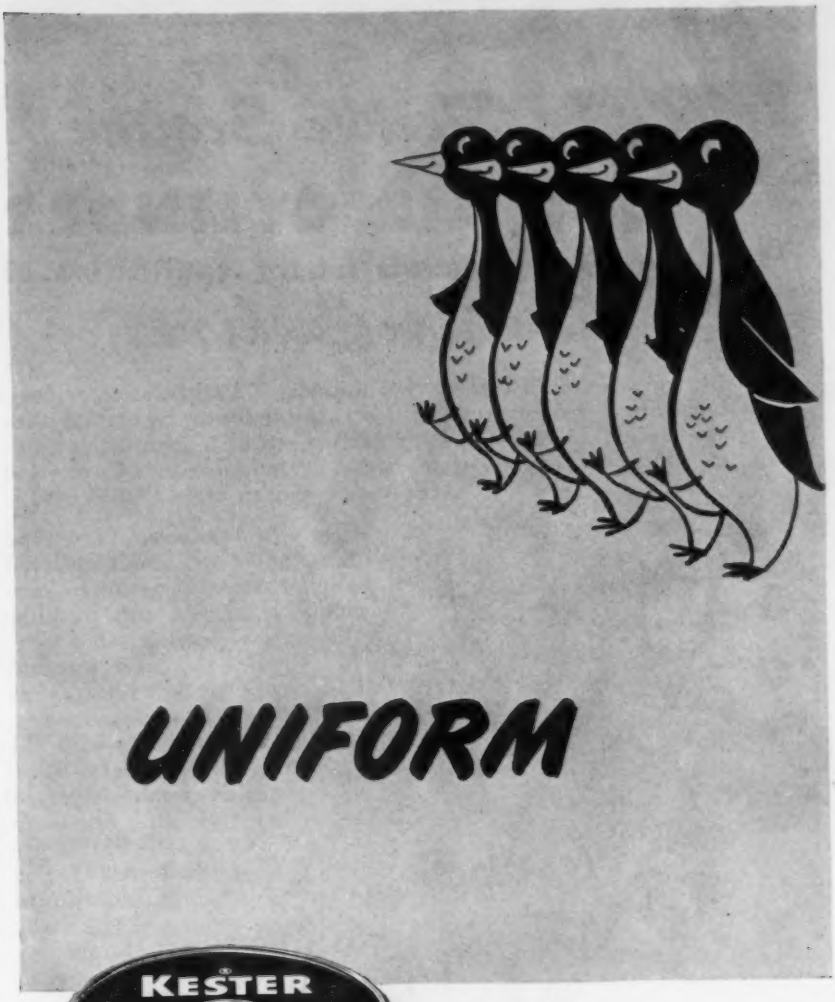

KESTER FLUX-CORE SOLDER

UNIFORM **Reduces Soldering Costs**

In using Kester, labor per assembly is held at the lowest practical minimum. Kester's uniformity also reduces waste of critical material to the diminishing point because Kester can give you Solder *engineered* to your own specific operation.

Kester alone has that necessary flexibility of flux-content (different core-sizes) providing just the right amount of flux needed.

Diameters ranging from 9 thousandths to one-quarter inch available in Kester "44" Resin, "Resin-Five," Plastic Rosin, "A," Nosput, Acid, Knorust and others.

KESTER SOLDER COMPANY
4215 Wrightwood Ave., Chicago 39
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KESTER SOLDER

New Flexible Sealing...

T-J AIR CYLINDER

Designed with revolutionary application of

Super-Cushion

It's *sealed with pressure*—a revolutionary T-J application of flexible sealing that insures positive cushion action combined with automatic valving action for fast return stroke . . . eliminates binding and sticking . . . operates with *low friction, minimum wear,* and *added power* due to higher efficiency.

More PLUS features! New type packing nut incorporates a piloted diameter, assuring perfect alignment. Improved rod packing increases sealing efficiency. Piston rod and internal cylinder tube surfaces are hard chrome plated—a standard practice with T-J for over 15 years. Basic design is safety-stressed for air line pressures up to 100# PSI. Write for bulletin 252. The Tomkins-Johnson Co., Jackson, Mich.

1. Metallic rod scraper to protect rod bearing and packing from dirt and grit.
2. Wrench flats.
3. Self-adjusting chevron type packing.
4. Permanent type adaptor ring.
5. Hi-tensile tie rods.
6. Heavy duty, hard chrome plated rod.
7. Generous fillet reduces stress concentration.
8. "O" ring static seal.
9. T-J new flexible cushion seal insures positive cushion with automatic valve action for fast return stroke. (Patent applied for)
10. Fine cushion adjustment.
11. Heavy wall precision honed hard chrome plate.
12. Controlled packing compression with metal to metal contact.

See us in Booth #1927
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36 YEARS' EXPERIENCE T-J

TOMKINS-JOHNSON

RIVITORS . . AIR AND HYDRAULIC CYLINDERS . CUTTERS . CLINCHORS

—Technical Briefs—

Copper:

Creep studies for cold-drawn product made by Bureau of Standards.

Studies of creep characteristics of cold-drawn copper, indicate the shape of extension-time curves are similar to those for annealed copper, high-purity aluminum and ingot iron, according to the National Bureau of Standards.

Samples studied, taken from previous lots used for high-purity copper studies, were cold-drawn to a 40 pct reduction in area. Specimens were tested at 110°, 250°, and 300° F with constant loads in tension.

Deformation in the second stage of creep was discontinuous, the degree of discontinuity being affected by test temperature and stress. No simple or consistent relation was found between ductility of cold-drawn copper and time required to attain either the third stage of creep or complete fracture.

At each temperature, cold-drawn copper was superior to annealed copper in resistance to creep and fracture. This superiority in strength was accompanied by a considerable loss in elongation at fracture.

Metallographic study of the specimens after testing in creep confirmed the previous finding that several modes of deformation occur during the creep tests.

For similar test conditions, the number and the size of the subcrystals observed in the region of the fracture were decreased by cold-drawing the copper prior to testing in creep.

Measure Minute Prop Strains

A better method of measuring and recording the strains affecting propellers in flight has been developed by Armour Research Foundation. The technique is three times as sensitive as previous methods and eight times as free from electrical interference. Strain gages are attached to the propellers. Under strain the gages are stretched and their electrical resistance changes, giving the location and severity of each strain.

Simple Gamma Survey Instrument

A new simplified gamma survey instrument, developed at the National Bureau of Standards electronic instrumentation laboratory, requires no microammeter.

Developed for the Navy Bureau of Ships, radiation levels are read directly from a potentiometer dial. To read an unknown value of radiation, the operator turns the dial to the point at which an audio oscillation just begins.

A detector tube of the halogen-filled GM type, together with a vibrator high-voltage power supply operating from flashlight-type batteries is used. Output current of the detector is proportional to the incident radiation.

Clutch:

Response time of magnetic clutch shaved . . . Speeds computers.

Response time of the National Bureau of Standards' magnetic fluid clutch can be cut to 1.5 milliseconds for 63 pct maximum torque, according to a recent study.

The clutch was invented in connection with the NBS electronic-digital-computer program to meet the need for a fast-acting start-stop computer input mechanism.

Distinctive feature of the clutch is the use of a magnetic fluid, consisting of a mixture of iron particles and oil, to couple the rotating

Turn to Page 186

"Just helping out the scrap drive, Officer."

new Snap-on* Catalog
OF INDUSTRIAL WRENCHES AND MECHANICS TOOLS
now ready for distribution
*Snap-on is the trademark of Snap-on Tools Corporation
Snap-on
"THE CHOICE OF BETTER MECHANICS"
SNAP-ON TOOLS CORPORATION KENOSHA, WISCONSIN
Send for your copy TODAY!

This complete and well-illustrated catalog describes Snap-on's entire line of standard wrench equipment and mechanic-type maintenance tools. The most complete line of its kind! Write today for your copy and discover why Snap-on is servicing businesses everywhere with tools for more efficient production, maintenance, and service.

- **42 Factory Branches to assure prompt shipment!**
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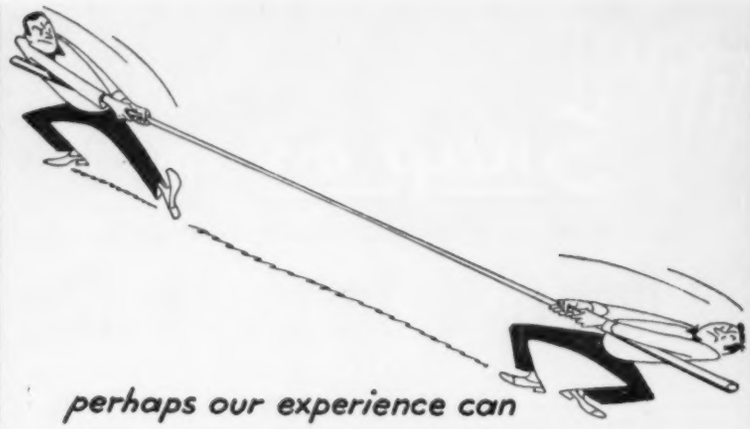
OVER ONE HUNDRED YEARS OF CONTINUOUS SERVICE. ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS

BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS



perhaps our experience can

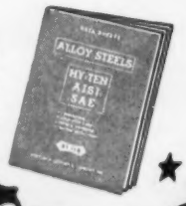
STRETCH

your alloy steel supplies!

You have doubtless heard about "bar-stretchers." Have you ever seen one? Wheelock, Lovejoy has several – any one of which can help you stretch your alloy steel supply so that you can keep up your production schedules during this period of unavoidable shortages. Having been in the steel business for over 100 years, our staff of metallurgists is in a unique position to help solve your difficulties. Our "bar-stretchers" include suggestions for substitute grades – alternate methods of manufacture – varying your present methods of treatment – and many more!

A letter or phone call to your nearest Wheelock, Lovejoy warehouse will bring an experienced man to help you stretch your alloy steel supply.

And he will be delighted to be of service! *SCRAP is worth money, and every pound turned in means more steel for you – so get in the SCRAP!*

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

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input member to the output member.

When a magnetic field is applied to the fluid, the mixture virtually solidifies, binding the input and output members together. Torque developed appears to be proportional to the magnetic flux, which is essentially proportional to the exciting current.

The clutch's magnetic circuit should be laminated for fastest response, otherwise current, flux, and torque will be slow to build up because of eddy currents.

Analysis shows the torque-to-inertia ratio will be maximized, favoring fast response, if the inertia of the clutch output disk equals three times the load inertia.

Ultimate natural frequency – and response speed—will generally be determined by the iron-oil mixture and the gap width in the magnetic circuits.

Alloys:

"Laboratory" metals finding wider application in metals industry.

Less familiar metals are adding to the utility of many alloys, Armour Research Foundation says. While these additives to the more widely known metal alloys are unfamiliar, they have definite properties of their own. Gallium and selenium are such metals.

Gallium occurs in extremely low concentrations in some zinc ores and in a few rare minerals, such as germanite. Either flue dust or the residue of zinc distillation are, besides germanite, the available technical sources. The price is about $3 per gram.

Gallium in its chemical behavior very much resembles aluminum. It has a density of about 6, looks like a low melting amalgam, and melts in the palm of the hand. Its melting point is only 30°C, whereas its boiling point is 2070°C. Thus, the metal has been used in quartz thermometers at temperatures far above those at which mercury could serve.

A liquid aluminum alloy to replace mercury has been suggested and among the other alloys are those

taking advantage of gallium's low melting point for metal baths; dental alloys based on the metal's excellent corrosion resistance. None of these applications has any substantial volume, however.

Selenium has as its most valuable characteristic its change in electrical conductivity when exposed to light. Selenium cells (electric eyes) are in common technical use for counting, scanning or sorting machines, safety devices, and light meters. Selenium is used also in rectifiers.

It has been proposed as a substitute for sulfur in an endless number of applications.

The principal metallurgical application of selenium is in copper alloys. Its addition renders the metals free cutting and allows their machining at high speeds. Even small amounts, on the order of .05 pct, improve creep strength and work hardening of tin.

"At least you could wait until it is scrap."

Oak Ridge Reactor School Seeks Industry Engineers for New Term

Industrial organizations interested in obtaining special training in nuclear reactor technology for experienced engineers in their employ are invited to sponsor their enrollment in the 1952-53 session of the Oak Ridge School of Reactor Technology. Deadline for applicants is Mar. 1, and the school term begins Sept. 8.

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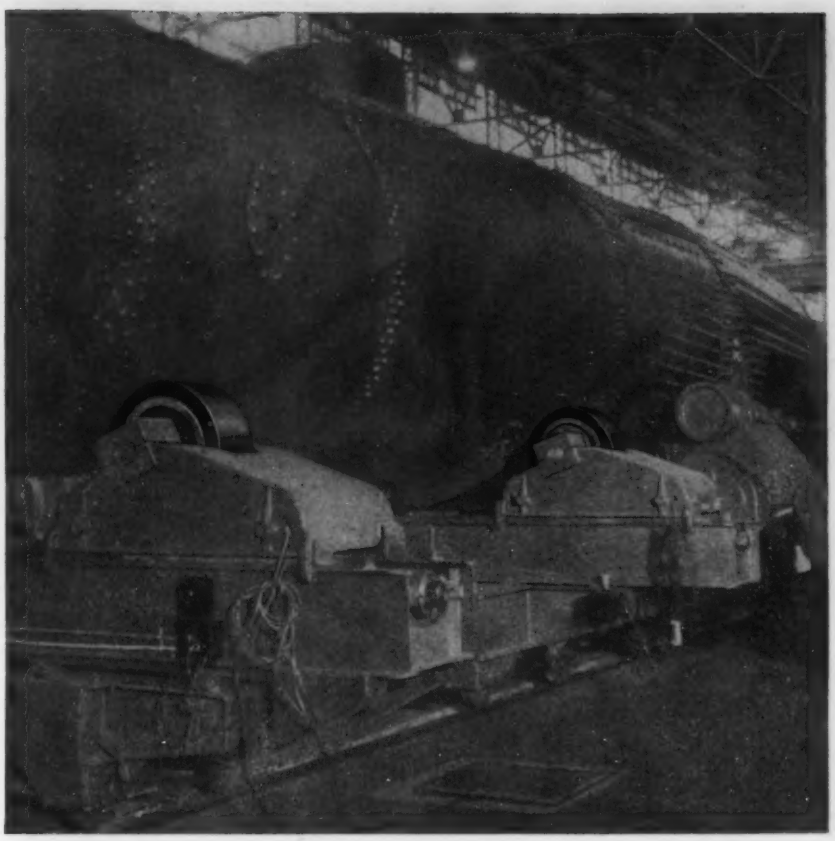

...it's rotated by rubber covered rolls

Imagine 50 tons of locomotive boiler cradled on and *rotated by* four rubber covered rolls! These power driven rolls turn the boiler slowly so that the seams can be welded continuously. It's a truly punishing assignment for rubber . . . one that demands extraordinary shear and abrasion resistance.

The special rubber compound developed for these rolls by Continental does an outstanding job. Actually, the service life of the rolls has far exceeded even the customer's expectations.

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Hundreds of standard grommets, bushings, rings, and extruded shapes are listed in this engineering catalog. It will be a valuable addition to your working file. Send for your copy today or . . .

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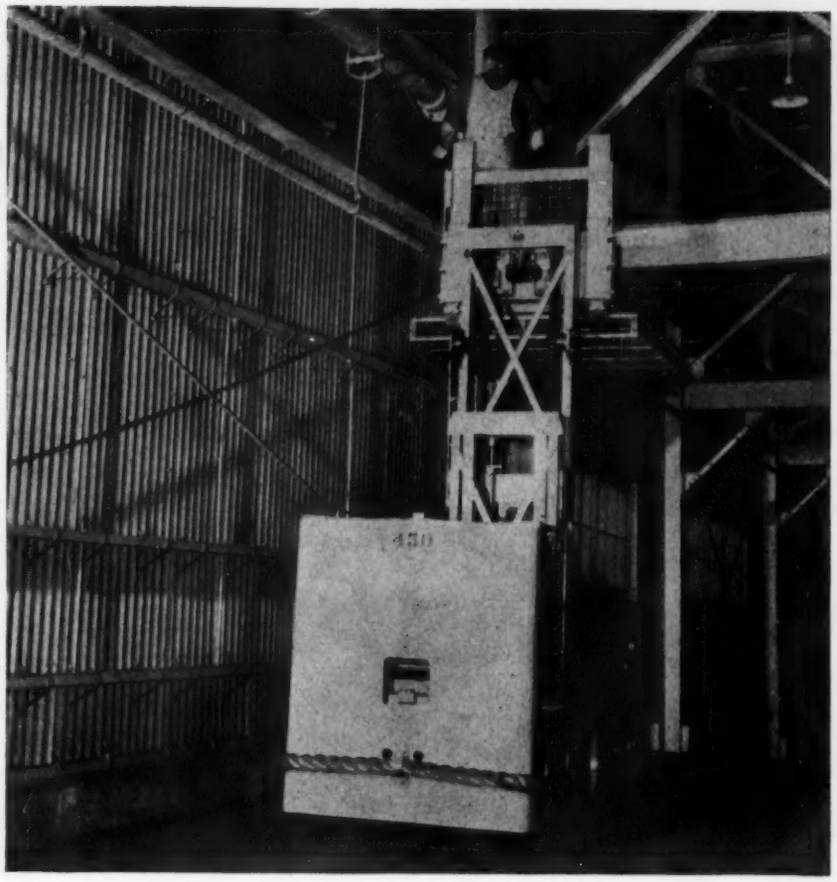

Material Handling plus Maintenance

This industrial truck, regularly employed for handling material in unit loads of 2000 to 4000 pounds, serves also to save time on many kinds of plant-maintenance jobs.

It is powered by a 28-cell D8 EDISON Nickel-Iron-Alkaline Storage Battery assembled in a demountable steel box, rated capacity 20.16 kwhr, which has been found ample for full-shift truck operation. Exchanging batteries at the end of one shift, gives the truck operating power for the next shift.

The battery is charged from current produced wholesale by a central station—the lowest cost power obtainable. In combination with a high-torque electric motor, it gives the truck an instant flow of power for starting and acceleration, yet is instantly and completely off during the many momentary pauses between the forward, back, up, down, and tilting motions of the truck while engaged in picking up, carrying, tiering and setting down loads.

The electric-motor drive is just as dependable and trouble-free as in stationary-machine drives. The battery, its cells made of steel, its alkaline electrolyte a preservative of steel, its principle of operation foolproof, is the longest-lived, most trouble-free of all types of storage batteries. Send for our bulletin *Modern Material Handling* for more information on the advantages of the unit-load method of handling material, the power requirements of industrial trucks and the characteristics of EDISON batteries. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Thomas A. Edison of Canada, Limited, Montreal.

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STORAGE BATTERIES

—Technical Briefs—

Castings:

Turntable, barrels in novel blast cleaning setup cut foundry costs.

A novel blast cleaning setup using a blast room, centrifugal-blast turntable and centrifugal-blast barrels has cut labor costs and increased foundry output and quality at the Farrel-Cheek Steel Co., Sandusky, Ohio.

Carbon and steel alloy castings are cleaned with eight different blasting units. Each blast cleaning machine handles specific casting types and sizes. Equipment includes four 14 cu ft and one 28 cu ft blast barrels.

TURNTABLE CARRIES castings inside blast room. Blast stops when door opens.

A turntable handles castings up to 6½ ft long and 5 ft high, weighing up to 1500 lb. Abrasive is hurled against the work by centrifugal force as the work is passed under the abrasive-throwing "wheel."

Work is placed on tables attached to each side of the door of the cleaning room. The door turns about a center axis and the operator loads one table while the other is inside the blastroom. With this arrangement the machine cleans castings 85 pct of the time, being stopped only to turn the door.

Green work is blasted 8 minutes and annealed castings 12. The machine averages 40 to 50 loads per 8-hr day. Hand cleaning methods are eliminated, cutting labor costs by 22 pct.

The Pangborn airblast room

cleans extra-large steel castings. Work is wheeled into the room on a rail-car and the operator, wearing protective clothing, directs a stream of air-driven abrasives against the work.

The 28-cu ft rocker barrel blasts large steel castings of sizes and shapes suitable for tumbling. As much as 2000 lb of castings may be placed in the barrel.

Abrasives are directed toward the center of the barrel as the barrel rocks, rolling the castings under the stream and turning them to make sure that abrasives bombard all surfaces of the steel castings.

Four 14-cu ft barrels use the same principle as the large one to clean smaller castings. Two barrels clean green castings and two clean annealed castings. About 95 1000-lb loads of green castings are cleaned per day. Each load is blasted for approximately eight minutes. Castings range from a few ounces to 40 lb.

A special unit cleans the surfaces of screw conveyors used on coal stokers. The conveyors are carried into the cabinet, cleaned on all surfaces.

Corrosion:

Hydrogen plant piping installations get cathodic protection.

Installation of a specially-engineered system has provided efficient cathodic protection for 2200 ft of underground piping at the Wilson & Co. hydrogen plant in Oklahoma City, Okla.

Although the plant was less than 5 years old when cathodic protection was installed by Harco Corp., a large percentage of piping already had required replacement. Much of the piping had been patched. After cathodic protection was installed only one leak was encountered.

Graphite anodes and a totally oil-immersed Class 1, Group D explosionproof rectifier were used in this installation. All plant piping was bonded together to make one complete electrical cir-

Turn to Page 190

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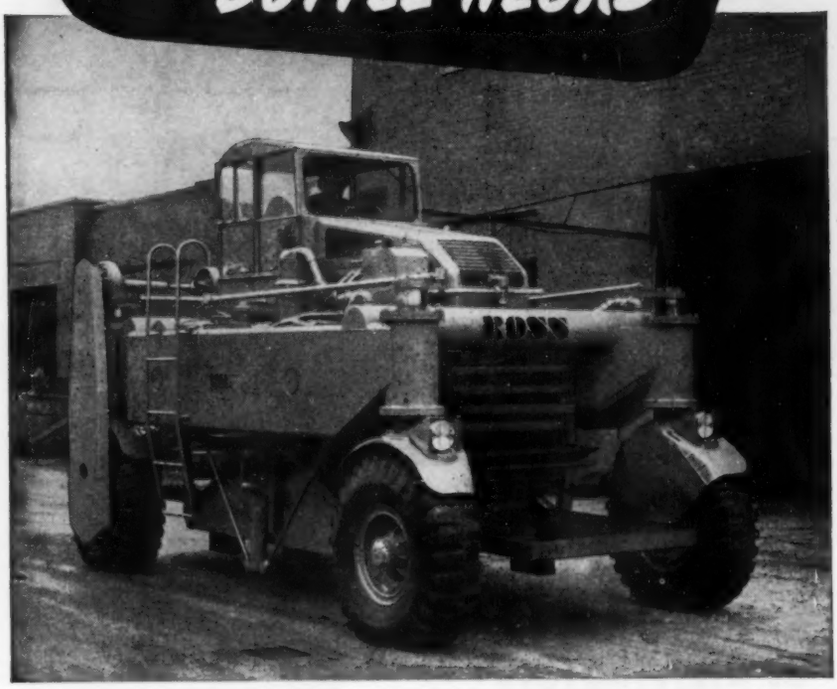

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cuit. Water service lines, process solution piping, steam and air lines, and natural gas lines as well as underground conduit now are cathodically protected.

In operation, the rectifier impresses a direct current on the anodes. This current radiates through backfill material and the soil to the metal pipe surfaces to oppose and counteract the electrochemical action that causes corrosion.

Most piping at the hydrogen plant is buried in or under concrete, and **maintenance** and replacement operations are difficult and costly.

A continuous processing cycle is essential to efficient production in this plant, and any leaks which interrupt its 24-hour day operations present a serious problem. An even more serious problem was posed by possible leaks in the propane lines which could permit lethal accumulations of this heavier-than-air gas in underground pockets and plant sewage system.

"That'll cut out some of those goodwill visits."

Prestressed Slabs:

Savings in steel and cement are predicted . . . Model to be tested.

Testing to destruction has begun at Southwest Research Institute on a 1/6th scale model of the first prestressed flat concrete slab of its type in the United States. The full-scale slab will be used in

the erection of a large laboratory building with the Youtz-Slick Lift Slab Method of Construction.

Results of the investigation will be applied in construction of the actual full-scale slab which, serving as a roof for a new laboratory building will be 88 by 38 ft in area and ½ ft thick. The roof will be supported on eight columns with 24-ft centers.

Object of the prestressed slab research program is to reduce the amount of steel and concrete required in fabricating slabs for large buildings.

By prestressing the steel which goes into the slabs, the Institute hopes to save more than one-half of the steel and perhaps 40 pct of the concrete required under conventional construction methods.

Work on the model will seek to determine load factors deflections, bending moments, stresses and strains, and safety.

First the slab was prestressed and the deflections read. Now testing will be made for load conditions with a dead load and a live load. Later testing will be made for plastic flow and creep characteristics. Finally, the model will be loaded to destruction to determine the over-all safety factor.

Institute engineers believe that by prestressing it may be feasible to build far larger spans using this type of construction than was possible in the past.

Tinplating:

Induction preheating speeds flow brightening of tinplate . . .

Speeds up to 2000 ft per min in flow brightening of tinplate may be attained through the use of induction preheating with high frequency rotating equipment William T. Thomas of General Electric Co. told the American Institute of Electrical Engineers recently.

Present maximum line speeds of 600 ft per minute by resistance heating are possible. By the preheating method speeds up to 1400

Turn to Page 192

you

furnish the specifications —we'll produce the gears . . .

Perkins *custom-made* Gears for trouble-free power transmission

PERKINS MAKES TO CUSTOMERS' SPECIFICATIONS IN ALL MATERIALS, METALLIC AND NON-METALLIC: *bevel gears, ratchets, ground thread worms, spiral gears, worm gears, helical gears, spur gears with shaved or ground teeth.*

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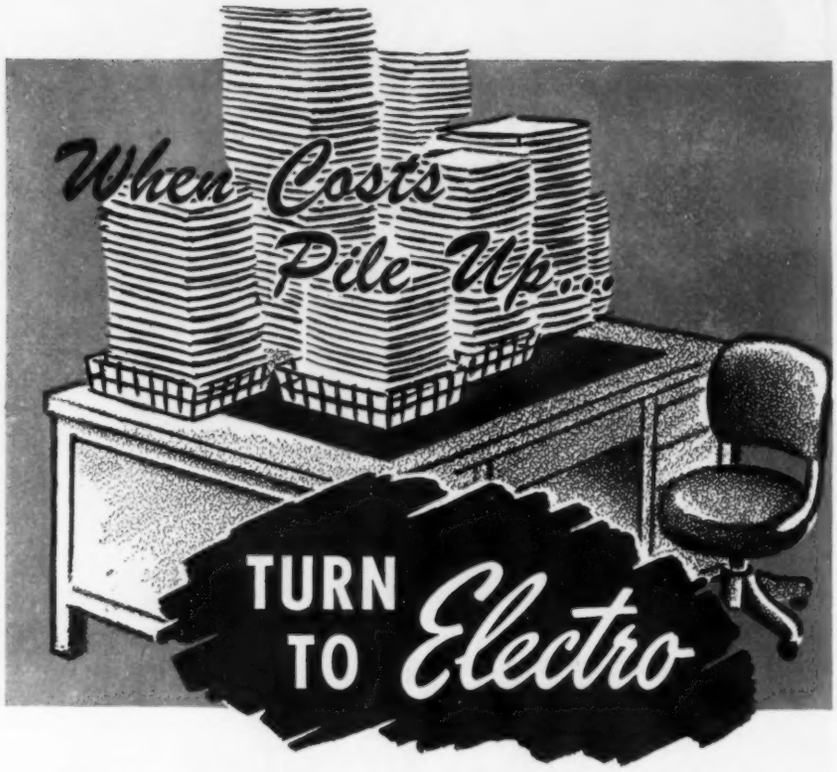

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In plant after plant, our Field Engineers have achieved splendidly. Given the opportunity, they'd probably add solution of your problems to their impressive lists of successes.

With their analyses of your objectives in hand, our laboratory technicians can produce *specific purpose* grinding wheels that will assure you an efficiency that will result in a wholly new degree of economy for you.

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SPECIFIC PURPOSE GRINDING WHEELS

ft per min have been attained and speeds to 2000 ft per min are expected.

High frequency rotating equipment of 9600 cycles is preferred as the preheating induction heating power supply is preferred. First cost is about 45 pct less and over-all efficiency is better.

Cost for maintenance is much less. No tube replacements are required. Highly trained personnel is not needed for conventional rotating machines and their associated equipment.

The insulation problem is not nearly as great because of low voltage power supply. Oscillator tube life can be increased by reducing peak operating oscillator plate voltage and plate current and allowing the high frequency generator to furnish some of the needed power (if maximum line speed has been reached).

Airfoil Fans

Teardrop-shaped fans more efficient, cut costs at power station.

Eight fans with airfoil fan blades will be used in the new Astoria Station of the Consolidated Edison Co. of New York City. Two sets of fans will be used for each of two boilers. Each set will consist of two fans in series, each fan driven by a 1250 hp motor.

Ordinary blades of centrifugal fans are simple rectangular metal plates—flat or curved—welded in the rotating element. Tests recently completed in Westinghouse's laboratory on a scale model indicated mechanical efficiency of airfoil blading of 92 pct compared to 84 pct for conventional bladed fans. The new fan develops 65 pct less noise energy than conventional fans.

The airfoil fan cross-section is similar to an airplane wing cross-section—teardrop shaped and curved backwards from its direction of rotation.

Such a blade exerts positive pressure on the air over its entire

face from the leading edge to the trailing edge. As a result, air flow has minimum turbulence.

Airfoil blades are more costly as each is a hollow steel shell with supporting struts welded longitudinally inside. The higher efficiency of this fan makes the construction worthwhile as the savings in horsepower during the write-off life more than repays the higher first cost.

Vane control is provided for efficient part load operation; one or both fans of the two in series can be operated as desired. The overall efficiency of the two fans in series is 86 pct. This makes possible still higher efficiency at partial loads.

Astoria Station fans will be the sole source of mechanical draft. New type, pressurized boilers—a boiler encased in an airtight jacket—eliminate the need for induced draft fans. Savings in space requirements, operating cost, and maintenance will result.

"Sorry we're not taking any more orders right now. Why don't you try us in a year or two?"

Steel Cut Electrolytically

Sectioning of metal bars by electrolytic methods — to guard personnel against hazards of machining metals exposed to atomic radiation—has been accomplished at the Columbia University School of Engineering under a grant from the Atomic Energy Commission.

Believed to be the first successful electrolytic cutting of metal in the United States, the process was developed by George L. Kehl, as-

Turn to Page 194

"My Choice? READY-POWER DRIVE ...Every Time!"

Ready-Power Drive is full electric drive featuring simple handling and full control, but with no limit to the hours of operation at peak efficiency. No wonder operators on incentive jobs prefer Ready-Power equipped trucks . . . they get more work done with less effort!

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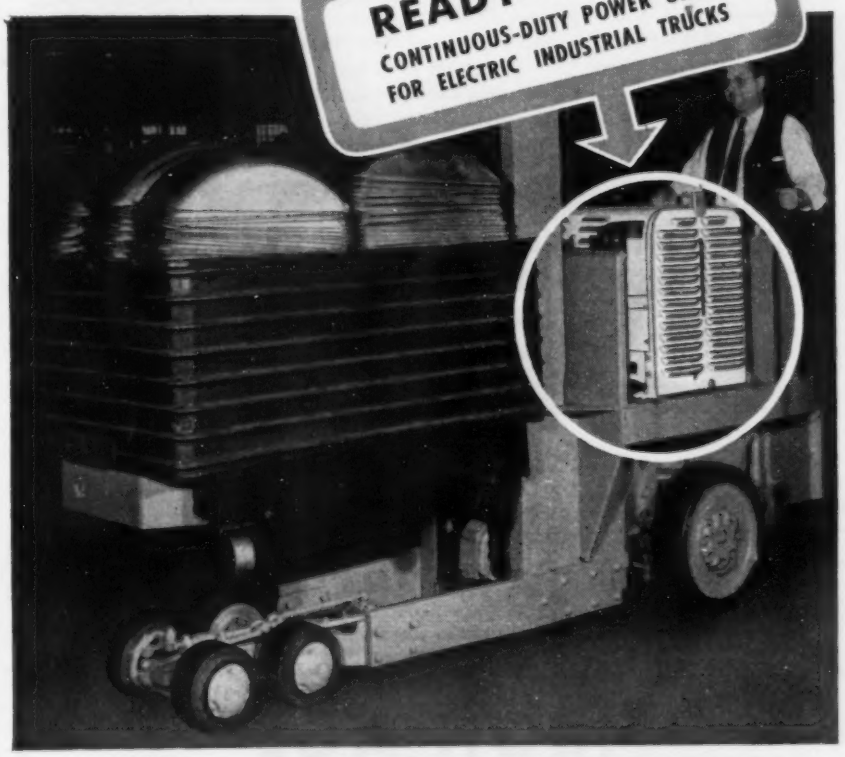

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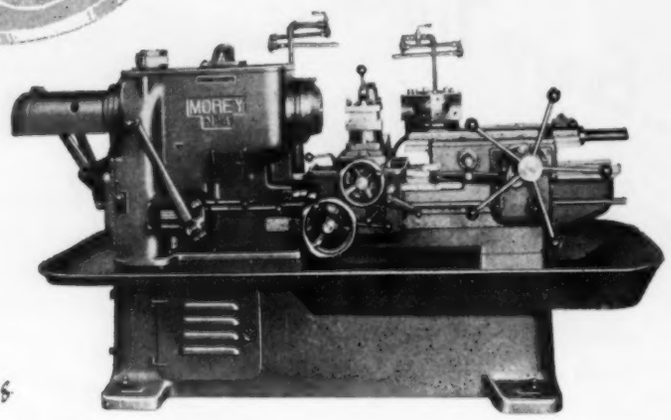

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Infinite variable vibrationless spindle speeds.

Remote speed selection control for speed and ease of operation.

The newly designed MOREY TURRET LATHES take advantage of tungsten carbide tools and incorporate all technical improvements in metals, electronics and hydraulics . . . our design is not hampered by tradition.

Size	Bar Capacity	Swing	Motor
No. 2 Plain.....	1" x 6"	14"	3 HP
No. 3 Universal....	1½" x 10"	16½"	5 HP
No. 4 Universal....	2" x 12"	19½"	7½ HP
No. 5 Universal....	2½" x 14"	21½"	15 HP

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sociate professor of metallurgy, and Irving Moch, Jr., research associate.

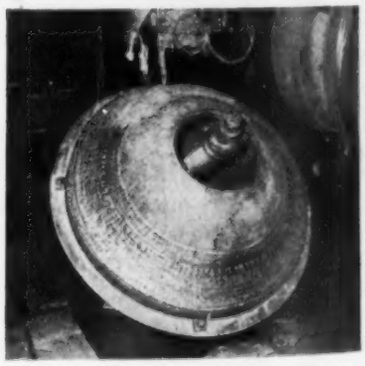
Steel bars ⅝ in. in diam have been cut in about 24 hr. Cut surfaces are comparable in flatness and smoothness to moderately fine machining. With further development of the process smooth, polished surfaces are expected.

The process consists of making the specimen to be cut the anode in an electrolytic cell and using an appropriate electrolyte and cathode assembly. The flatness of the cut surface is produced by a novel design of cathode assembly.

Manganese Crusher Parts Rebuilt

Manganese crusher cones and mantles, rebuilt and hard-surfaced using the Unionmelt welding process by Finning Tractor and Equipment Co., Ltd., Vancouver, B. C., now outlast original factory parts, a series of studies have shown.

New cones and mantles are surfaced by applying a special hard-facing underlay first, and then overlaying with hard-facing rod. For units that have been in service, a preliminary buildup of manganese-steel may be required prior to depositing the special hard-facing underlay. If the unit is worn more than ½ in., reclamation of the cones and mantles is not attempted.



CRUSHER CONES rebuilt and hardsurfaced outlast original parts.

The crusher part is first given a preheat from 150° to 200° F and during welding the temperature of the part is kept below 500° F at all times.

"For little or no remuneration you can obtain my services as a product tester."

Heat Transfer:

Transverse fintube exchangers studied to learn power loss.

Heat transfer in transverse fintube exchangers is becoming increasingly important, F. W. Braun, Jr., and James G. Knudsen told members of the American Institute of Chemical Engineers. Their experiments aimed at determining power loss in pumping through such exchangers.

Pressure drops for water flowing in annuli containing transverse fin tubes were made by assembling circular aluminum fins and copper spacers on a solid rod. Using various combinations of fin height and fin spacing, 22 different fin tubes were tested.

Data were correlated as friction factor vs. Reynolds numbers using equivalent diameter. In the region of turbulent flow it was found that a fin tube having a given fin height has a maximum friction factor when the fin spacing is 4 to 5.5 x the fin height.

Turbulent flow friction factor plots are presented which may be used to predict friction factors in annuli containing transverse fin tubes, the error in these predicted values being of the order of ± 15 pct in most cases. Errors of 50 pct may be encountered at low values of the fin spacing to fin height ratio.

Turn to Page 196

How leading plate glass maker cut cost 5 ways by solving handling problem

EDMONT CASE NO. 209

Problem: How to prevent accidents and improve production efficiency in the manufacture of window glass, an extremely sharp-edged, slippery and fragile material handled in large sheets which must be cut and stacked by hand.

Management Solution: On-the-job tests proved that fabric gloves coated with rough-finished natural rubber on palm and thumb gave workers positive non-slip grip on sheet glass, with maximum protection against cutting injuries; also wore several times longer than other type gloves. (Company name on request.)

Count these 5 cost savings, available wherever sharp, abrasive or slippery materials are handled, with or without the presence of heat, oil, acid, caustic, solvents or degreasants:

1: Fewer lost-time accidents 2: Faster, surer work handling 3: Less spoilage 4: Improved job attitude 5: 40% to 70% saving in usual glove cost to companies or employees.

There's a correct glove for every job
Good management makes it available

To meet different service requirements — tough coatings of NEOX (specially reinforced neoprene), natural rubber or vinyl plastic, bonded to comfortable, sweat-absorbing, insulating fabric.

We offer consulting service on specific problems or complete plant surveys: (Used by Pittsburgh Plate Glass, Bethlehem Steel, Goodyear, Packard, many others.

Without cost or obligation we will gladly study your hand-protection problems and practices, make recommendations and furnish the procedures and materials for complete on-the-job tests. For full information, write our Safety Engineering Service.

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Technical Briefs

Steel Enameling:

Source of defect producing gas traced to water in frit . . .

Hydrogen gas evolved during and after the firing operation, long recognized as a cause of defects in porcelain-enameled and ceramic-coated steel, has been traced to water in the frit. Deuterium was used to locate the hydrogen.

At high temperatures the gas may cause blistering during the firing, or "reboil" (the blistering of a vitreous coating when reheated after the first firing). At ordinary temperatures, if the gas is trapped in the steel during rapid cooling after firing and later escapes, "fishscaling" may occur; gas pressure opens scale-like fissures, and in some cases literally blows off flakes of the coating.

Until now, the relative importance of the different possible sources of the hydrogen causing the defects has been largely a matter of conjecture. Uncertainty as to the origin of the gas has made the problem difficult to cope with effectively.

A recent National Bureau of Standards investigation, using heavy hydrogen as a tracer, indicates water present in the frit (glass) used in the coating is largely to blame for hydrogen-produced defects.

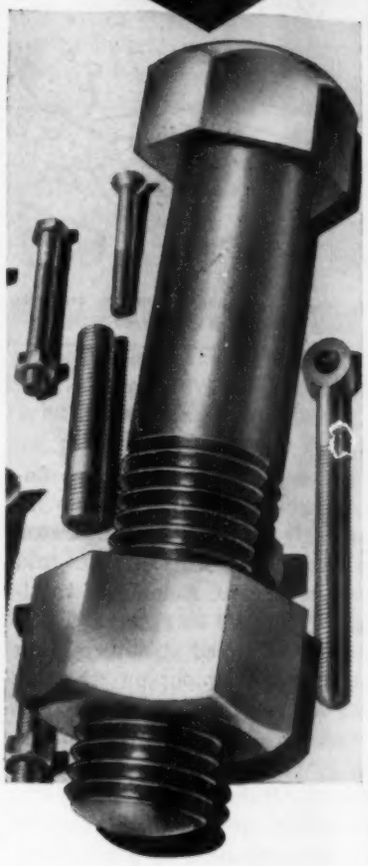
Experiments demonstrate the feasibility of producing a coating free from hydrogen defects, by using a water-free frit.

The finding with the heavy hydrogen tracer—that dissolved water in the frit was the principle source of defect-producing hydrogen—was confirmed by supplemental experiments.

In these, steel specimens coated with normally prepared frit were compared for defects with specimens coated with frit from which dissolved water had been largely or entirely removed.

In each case the frit was applied without the use of the cus-

First for
BOLTS
NUTS
STUDS



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THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.

tomary clay, water, and other mill additions. This was done by dry-grinding the frit, suspending it in a water-free organic solvent, and spraying it on. After air-drying, the specimens were fired for the normal time.

Two methods of preparing water-free frit were used in these experiments: drying normally prepared frit by vacuum melting, and preparing frit from dried raw materials. Neither lifting nor fish-scaling occurred with the vacuum-melted frit, although both these defects were pronounced with the normally prepared frit.

Other experiments with reboiling gave confirmatory results. Attempts to prepare defect-free frit from raw materials from which most of the water had been removed were somewhat less successful; some defects developed, though not nearly as many as with the normally prepared frit.

"Oh—he just suggested a few minor changes."

Film Flow:

Mechanics of flow important in cases of heat, mass transfer.

Understanding of the mechanics of film flow is of importance in cases of heat and mass transfer which involve 2-phase flow, according to O. P. Bergelin and A. E. Dukler, of the University of Delaware. Their paper was read at a recent meeting of the Ameri-

Turn to Page 198

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—Technical Briefs—

can Institute of Chemical Engineers.

Flow in vertical condensers, film reactors, water tube boilers operating at high flow rates, and packed towers are a few practical examples of this flow configuration. Lack of information on the hydrodynamics of flow of liquid film, validity mass and heat transfer analyses in industrial equipment have, in general, rested on empirical methods.

New equations were developed by the authors using the von Karman velocity distribution theory which relate liquid film thickness in cocurrent, gas-liquid flow to the flow rates, physical properties of the fluids and to the energy loss.

For the case of no gas flowing these equations reduced to give the film thickness as a function of flow rate and physical properties over the complete viscous to turbulent flow range. From these equations it was shown the transition from laminar to turbulent film flow occurred at a Reynolds number of 1080.

Equipment for measurement of liquid film thickness and wave profile based on a capacitance technique was described and this equipment was shown to be capable of measuring film thicknesses to an accuracy of 0.001 in.

The authors' measurements of the thickness of water films flowing down a vertical plate by this technique substantiated the theoretical equations developed for this case to within 0.001 in.

Adjustable Voltage Drives Used

Unloading towers and ore bridges used to handle iron ore at points of trans-shipment or at steel mills are adopting adjustable voltage drives. First use of the system was at the Otis Works of Jones & Laughlin Steel Corp. last year.

AC power is transmitted at high voltage (4160v) to the bridge, which carries its own conversion equipment.

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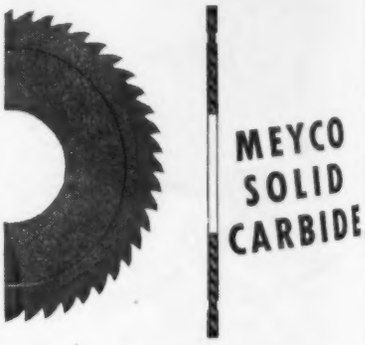

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—Technical Briefs—

Conservation:

English learn economy tips on trips through U. S. plants . . .

British specialists are swapping knowhow with America on how to stretch supplies of basic raw materials. Under a program of the Anglo-American Council on Productivity and the Economic Cooperation Administration, a group is reporting on work done in the U. S. to conserve materials.

Much of the report deals with advances made in recent years in the United States in the use of low-alloy or plain carbon steels.

In numerous branches of the American engineering and allied industries the use of steels of this type has been pushed ahead rapidly and vigorously.

Considerable savings of scarce ferro-alloys and alloying elements appear to be possible here by the employment of similar techniques. This would make available more alloying metals for those steels where their use is essential.

By contrast, the United States aircraft industry appears to be using steels containing substantially higher proportions of scarce alloying elements than the equivalent British industry.

It seems likely that by suitable modifications in design and specification the United States could achieve considerable economies in the scarce alloying elements.

Nonferrous metals shortages in the United States seem already to be impeding industrial production and vigorous short-term conservation measures are being taken, in particular with nickel, lead and tin.

Further study in this field by specific interested British industries is recommended. It is possible for British knowledge to make a contribution to the problem of American shortages.

New British techniques such as combined tin-zinc and tin-nickel

Turn to Page 200

MORE Determinations per Tube

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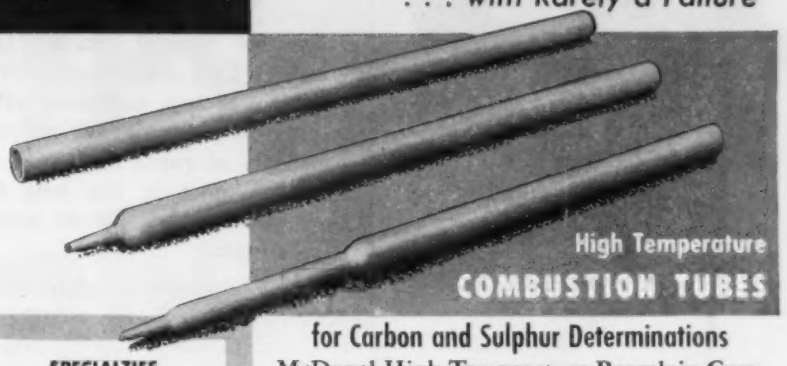

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—Technical Briefs—

electro-deposition could be made more widely known and employed in the United States, the team reports.

In the United States there seems to be a considerable future for light metals and their alloys. Aluminum and magnesium show prospects of rapid expansion and seem destined in the long term to replace other scarcer nonferrous metals.

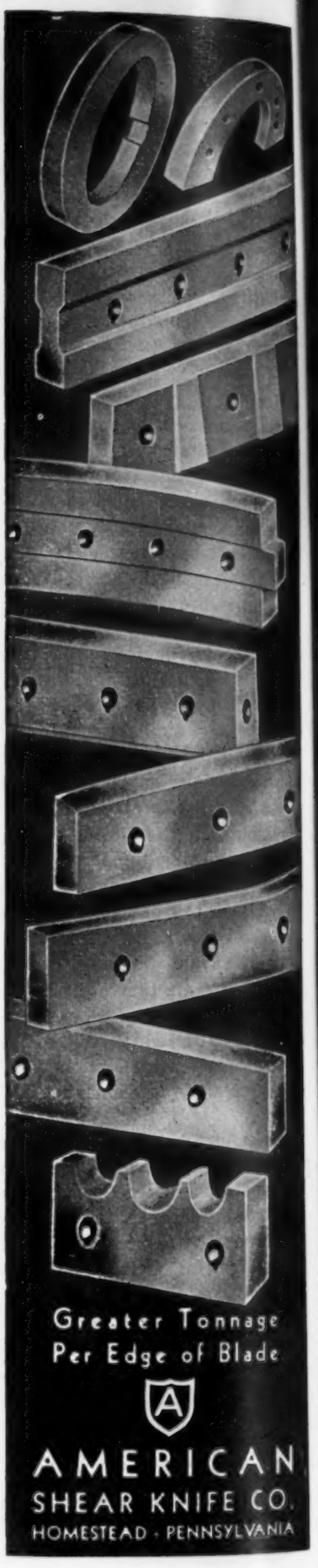
The team found substitution of plastics and plastic components for metals does not appear to have made greater progress in the United States than in the United Kingdom. There were, however, a number of interesting uses for some of the newer plastics, particularly in sheathing electrical conductor cables.

Shortages of materials and their possible effect in dislocating industrial production are issues which need careful and continuous explanation to avoid misunderstanding between management and workers. The report suggests that methods of joint consultation practiced in Britain merit study by American industry.

Vibration:

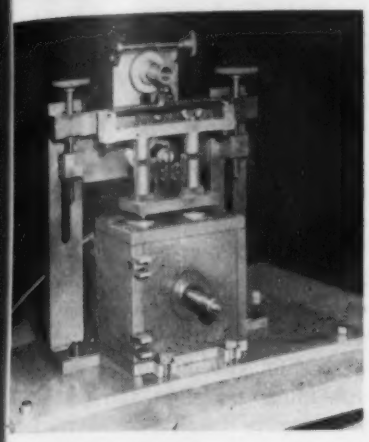
Many engineering problems presented . . . Laboratories give answers.

Many vibration control problems call for specialized research to determine the most effective and economical type of mountings or the specific type of elastomer to meet all requirements.



Technical Briefs

Answers to the variety of engineering problems presented by vibration are being supplied by the engineering and development laboratories of Lord Mfg. Co., Erie, Pa.



HYSTERESIS and dynamic modulus of elastomers are measured in specially designed apparatus. Double sandwich specimen uses SR-4 resistance wire strain gages.

To speed measurement of load-deflection properties of vibration-control mountings and elastomers, and to improve the accuracy of these measurements, the Lord Engineering Research Laboratory recently acquired a new Model PTE Baldwin Universal testing machine of 5000 lb capacity.

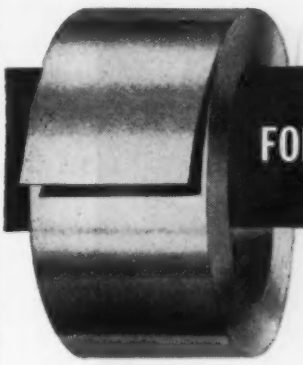
Both the indicating hand, on a dial scale 66 in. long, and the autographic recorder stylus are activated by an Emery hydraulic load cell acting through a pneumatically-operated, null-balance system.

Deflections of mountings are measured by movement of the core of a miniature variable transformer mounted on the platen of the testing machine and activated by the moving crosshead.

A similar transformer in the recorder follows deflections of the sending Microformer and rotates the chart roll proportionally. The recorder automatically plots load-deflection curves when desired. Availability of several scale ranges is a factor in the high accuracy attained, it is reported. Accuracy in per cent of reading is

Turn to Page 202

typewriters tables & time-saving



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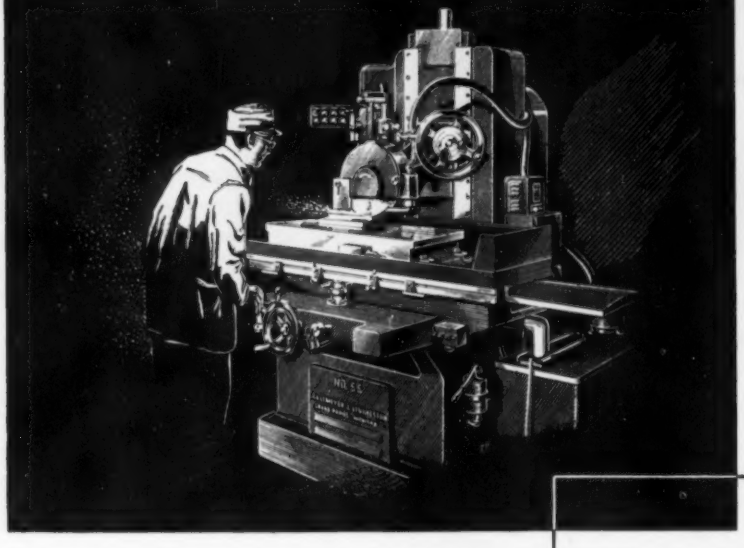

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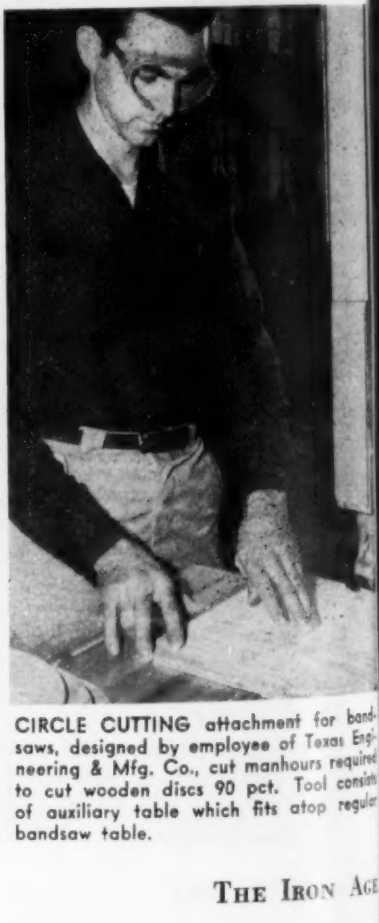
The testing machine is in daily use both for tests of mountings and of the materials used in mountings. Nearly all elastic mountings take advantage of the "softness" of elastomers in shear. They exhibit low deflections in compression and tension for resistance to forces in other directions.

Standard test specimens consist of a double sandwich of the elastomer between three small, rectangular pieces of metal plate. Shear loads are applied downward on the edge of the center plate and upward on the two outside plates on the edges of which the specimen rests on the platen of the testing machine.

Enamel Speeds Coal Handling

The coal handling problem in the Trenton plant of the Thermoid Co. was recently solved by using industrial porcelain enamel. Screw conveyers were coated with an acid-resisting, high gloss porcelain enamel by Erie Enameling Co.



CIRCLE CUTTING attachment for bandsaws, designed by employee of Texas Engineering & Mfg. Co., cut manhours required to cut wooden discs 90 pct. Tool consists of auxiliary table which fits atop regular bandsaw table.

Steel Industry Caught in Squeeze Play

Both government and labor are putting on the pressure for more wages . . . Some expect a basic increase of 15¢ per hr . . . OPS still denies price relief until pay boosts come through.

It looked this week as if the steel industry were going to be the victim of a giant squeeze play—with labor on one side, government on the other and steel companies in the middle. Some Washington circles were quite sure the steelworkers would get an increase of 15¢ an hr or more after window dressing before the Wage Stabilization Board had been completed.

But this increase would apply to the base rate. After suitable adjustment in the 32 different wage classifications, it would be found that the average increase would really average 18½¢ an hr. This 3½¢ joker in the wage deck always shows up late in the game.

Strike Danger — Insistence of stabilization officials that the steel industry cannot get price relief until higher labor costs become an actual fact increases the danger of a strike. Steel companies will not agree to any wage recommendations unless they stand a chance of recouping direct labor costs through higher prices.

Some sources believe the price stabilizers may be indulging in a bit of window dressing of their own. Ringing in the Capehart Amendment in return for higher wages is hardly a fair trade. It will be recalled that the purpose of this amendment was to cover higher costs from the Korean War up to last July. Although some steel companies believe their cost increases under this formula make them eligible for increases up to $4 a ton, they are aware that it doesn't cover above-formula wages.

Dubious Honor—But this may yet be the plum that is dangled before the eyes of the steel industry. There is no doubt that it is being fully explored as a face-saving "out" for Administration leaders who would like to claim that they held the line on prices. This could prove a key note in the squeeze symphony.

The window dressing on wages isn't so difficult. Among the steelworkers' 22 demands are a number of extras, or fringes, which could be passed off as something other than a straight wage increase. Among these are holidays, overtime, incentive rates, and guaranteed annual wage. Some, or all, of these could be tacked on to a straight cost-of-living increase to make up the wage package.

Means and End—Although the means are devious, the crux of the matter is simple. If the steel industry doesn't get enough price increase to cover the higher wages —no matter what route the Administration decides to take—there will be a steel strike. It would come the last of this month, or in March.

But, before that happens, there is a strong chance the squeeze play may be completed. This would call for labor getting its 15¢ or more per hr, and steel companies falling short of getting what they consider to be the direct costs of such an increase.

Falling Short—From here on the big question is how much per ton "falling short" is to be. This week the answer apparently was still in the White House. The same series of events took place in 1946, and, in a milder way, in 1949. As yet, there is no reason to believe this latest wage-price impasse will be settled any differently than those that went before. If history repeats itself, as expected, the sixth wage round is a practical certainty. It will be accompanied by higher steel prices, possibly to the tune of $5 to $7 a ton.

Industry sources say that prices would have to be raised $6 to $8 a ton to cover a 15¢ an hr wage boost. Adding $4 a ton to cover other cost increases under the Capehart Amendment, would bring the total price increase to $10-$12 a ton. But the squeeze play will reduce that figure, perhaps by half.

Acrobatics—After several weeks of tight-rope walking, Office of Price Stabilization last week finally furnished the industry a draft of a proposed order to bring steel under Capehart-formula pricing. An industry advisory group will meet to discuss the draft with OPS toward the end of this week, although their accounting departments have warned that they can not begin to analyze and apply the voluminous order in that short time.

Ingot Rate Up—Steelmaking operations this week are scheduled at 100.5 pct of rated capacity, up half a point from the previous week. The desperate scrap shortage has not eased. But better allocations and long freight hauls have enabled some of the hardship cases to keep pouring metal. New capacity, now coming in at a terriffic rate will enable the industry to produce above its rated capacity—if labor and scrap permit.

Bethlehem Steel alone is planning to bring in a million tons of new capacity before the middle of the year. In addition, the overall expansion program has been enlarged by another 500,000 tons so that the company's total capacity early in 1953 will be 18.4 million net tons per year.

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Market Briefs

asks loan — Defense Production Administration disclosed last week that it is considering a request from Central Iron & Steel Co., of Harrisburg, Pa., for a $55,950,000 loan which would be used to finance an integrated steel mill in the Harrisburg area. Loan, if granted, would be disbursed by Reconstruction Finance Corp. DPA has not yet indicated whether or not it will approve the application. In a separate application, Central has requested and received DPA approval for $4 million worth of fast amortization on facilities to be constructed in the Harrisburg area and approval of a $1,091,000 request for fast amortization on facilities to be built in the Chester, Pa., area.

financing—Inland Steel Co. directors have approved plans for new financing of $50 million. Thirty million will be used for capital expenditures, the remaining $20 million as working capital. One half will be offered to stockholders for subscription, one half offered publicly as first mortgage bonds.

expect rise — Japan plans to produce 4.3 million tons of pig iron and 5 million tons of steel in 1952. Exports of iron and steel are expected to rise from 1.1 million tons in 1951 to 1.5 million tons this year. For the first time, Japan is exporting steel to Europe.

strike loss—A strike of tug boat workers and hoist operators at the Clairton Plant of U. S. Steel Co. caused a loss of 4000 ingot tons last week. The walkout over wage rates ended at midnight last Friday with submission of the dispute to regular grievance procedure. Normal operations were resumed at midnight Saturday.

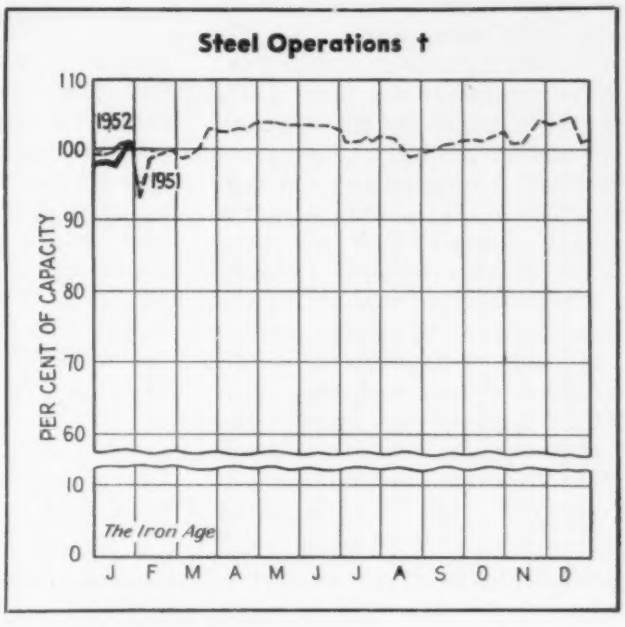
tinplate decontrol? —Pressure is on for decontrol of tinplate. Tinplate Advisory Committee has already recommended this. The market has grown soft in spots. Government restrictions are being blamed. Some observers are predicting a 25 to 30 pct drop in demand in fourth quarter unless controls are lifted.

less steel — Smaller allocations of iron and steel will cut British farm machinery output in 1952. Emphasis is to remain on exports, which are to be increased. Fewer tractors, harvesters, etc., will be available to home farmers.

optimistic — Sixty pct of plants investigated recently by National Production Authority were over their steel inventory allotments, said Walter S. Doxsey, president, American Steel Warehouse Assn., speaking before the Central States Chapter of ASWA at Chicago, Jan. 30. Conversion steel is falling off, rolled plate is easier, and warehouses are getting above-quota allotments, Mr. Doxsey reported. With production up, shipments to warehouses of aircraft quality steels can be expected to increase, though boron steels will continue to be tight, it was predicted.

buys furnace — Steel Co. of Canada Ltd., has given a contract to Rust Engineering Co. of Canada Ltd., for installation of a continuous slab heating furnace, which will increase rolled strip capacity at the Hamilton works by about 100 pct. Furnace will have a rated capacity of 110 tons per hr and will serve the hot strip mill and supplement the present two 60-ton per hr furnaces.

in the market — The Southern Ry. soon will ask bids on 3500 hopper and gondola cars, its new president, Barry A. DeButts, who is making an inspection tour of the system, said last week.



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Jan. 27	101.0	101.5	101.0*	100.0	100.0*	104.0	102.5*	106.0	102.0	104.0	85.5*	86.5	103.5	100.0
Feb. 3	103.0	101.5	102.0	100.0	98.5	104.0	101.0	106.0	100.0	104.0	81.5	85.1	110.5	100.5

† Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.
* Revised.

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See 31 pct Nickel Supply Boost

DPA expects supply to reach 132,000 tons in 1954 . . . May change nickel price regulations . . . Lead, zinc bills now in House . . . Brass mills cut work week—*By R. L. Hatschek.*

The 1954 nickel supply will total 132,000 tons if present plans are carried out to the letter. Defense Production Administration anticipates domestic primary production in that year will reach 1400 tons, secondary output 9000 tons and imports 121,600 tons.

These figures compare with a 1950 total of 100,500 tons made up of 900 tons domestic primary output, 8000 tons domestic scrap recovery and 91,600 tons of imported nickel. The expected 1954 imports will consist of some 106,000 tons from Canada and 15,000 tons from the U. S. Government's plant in Nicaro, Cuba.

Review Nickel Pricing—Federal price controllers propose to amend the nickel scrap order (CPR 29) by adding a provision covering unlisted grades. Some new grades would be added and specifications of certain grades would be rewritten. No changes in the general level of ceiling prices for nickel scrap are being considered, Office of Price Stabilization said.

The agency is working on another order for pricing nickel alloy ingots. This regulation would establish dollars and cents ceilings for ingots in relation to the price of primary metal and scrap. A nickel anode regulation is also under OPS study. This, too, would establish prices in relation to primary nickel and nickel scrap.

Still Waiting — Consumers are now waiting for the House of Representatives to pass the bills suspending lead and zinc import duties. The Senate last week passed both after tacking an amendment to each. The zinc bill would now suspend the tariff on ores, concentrates and metal until Mar. 31, 1953, or the end of the national emergency, provided that the price of Prime Western, f.o.b. E. St. Louis, does not fall below 18¢ per lb for any calendar month. The lead bill has the same floor.

Ask Reduced Control—Industry has recommended that National Production Authority drop allocation of imported lead except for inventory and end-use restrictions. Industry points out that suspension of the import tariff will further boost the already increasing influx of foreign lead. Settlement of labor difficulties now indicates the smelting of 46,000 tons in March, according to industry spokesmen, and the outlook is that even without the tariff suspension, five nations alone will ship to the U. S. 17,000 tons monthly.

Calling the lead shortage a direct result of government price fixing, Felix E. Wormser, vice-president of St. Joseph Lead Co., called for the elimination of lead and zinc price regulations. Such a move, he said, would lead to a cessation of the shortage.

Short Weeks—The copper shortage is once again biting into operations of Connecticut brass companies. Last week Chase Brass & Copper Co. was forced to cut operations to 4 days per week and the Thomaston branch of Plume & Atwood Mfg. Co. had to cut back to a 3-day work week. Chase says that the 4-day week is likely to be a necessity for February.

Aluminum Steady—Official November aluminum production totaled 72,274 tons compared to 72,647 tons for the preceding month. This brought the 11-month total to 764,427 tons. The Aluminum Assn. reported foil shipments for the month of 6,511,106 lb, a million lb less than the October total of 7,521,864.

Power Contract—Contracts were signed and approved last week for the power supply of Reynolds Metals Co.'s new smelter to be located somewhere in Arkansas. Southwestern Power Administration will supply 35 pct and Arkansas Power & Light Co. will supply 65 pct of the power 110,000 kw of firm power at 4 mills per kwhr.

MONTHLY AVERAGE PRICES

The average prices of the major nonferrous metals in January based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	24.50
Lake copper, delivered	24.625
Straits tin, New York	$1.0973
Zinc, East St. Louis	19.50
Zinc, New York	20.29
Lead, St. Louis	18.80
Lead New York	19.00

NONFERROUS METAL PRICES

	Jan. 30	Jan. 31	Feb. 1	Feb. 2	Feb. 4	Feb. 5
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	....	$1.215	$1.215
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis	18.80	18.80	18.80	18.80	18.80	18.80

Note: Quotations are going prices.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 33.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63-S-T-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.24 x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in, $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 33.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 66¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ⅓ to ⅝ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ⅝ in. diam, 10,000 lb; ⅝ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb, ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76; 0.165 to 0.219, ⅞ to ⅞, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb.; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	82	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68	....	41.23
Copper, h-r	....	37.53	....
Copper, drawn	....	38.78	....
Low brass	39.67	39.36	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.20	37.26	38.52
Leaded copper	....	41.58	....
Com'l bronze	41.13	40.82	....
Mang. bronze	46.92	40.81	42.37
Phos. bronze	61.07	61.32	....
Muntz metal	41.18	36.74	37.99
Ni silver, 10 pct	49.32	52.04	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	50.00
Beryllium copper, 3.75-4.25% Be	1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium dollars per troy oz.	$200
Lead, St. Louis	18.80
Lead, New York	19.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	$203 to $207
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	88.00
Tin, New York	$1.215
Titanium, sponge	$5.00
Zinc, East St. Louis	19.50
Zinc, New York	20.20
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	21.3
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy	20.8
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.34
Electrodeposited	33⅝
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	35½
Nickel 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20⅝
Yellow brass	19½	17⅝
Red brass	20½	19⅝
Comm. bronze	20½	19⅝
Mang. bronze	18½	17⅝
Brass rod ends	18⅝	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Maker's Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17¼—17⅝
Light copper	16 —16½
New type shell cuttings	16 —16½
Auto radiators (unsweated)	14¼—14⅝
No. 1 composition	18 —18½
No. 1 composition turnings	17¾—18
Unlined red car boxes	16½—17¼
Cocks and faucets	15½—16
Mixed heavy yellow brass	12 —12½
Old rolled brass	15 —15½
Brass pipe	16 —16½
New soft brass clippings	16 —16¼
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½

Aluminum

Alum. pistons and struts	6½— 7½
Aluminum crankcases	7½— 8
2S aluminum clippings	10½
Old sheet and utensils	7½— 8
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	7½— 8

Zinc

New zinc clippings	13¼—13½
Old zinc	10 —10¼
Zinc routings	6¾— 7
Old die cast scrap	6¾— 7

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	15¾—16
Battery plates (dry)	10 —10½
Batteries, acid free	7 — 7¼

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	100 —110
No. 1 pewter	80
No. 1 auto babbitt	60
Mixed common babbitt	16¼—16½
Solder joints	22 —23
Siphon tops	60
Small foundry type	21 —22
Monotype	18½—19
Lino. and stereotype	17½—18
Electrotype	15 —16½
Hand picked type shells	10 —11
Lino. and stero. dross	8¾— 9
Electro. dross	7½— 8

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Ease Taboos on Forbidden Grades

New amendment allows agency to permit premiums for some grades to keep furnaces going . . . Steelmakers happy about it, but foundrymen worry about rises in defense demands.

An emergency clause in Amendment 7 to Ceiling Price Reg. 5 appoints National Production Authority as virtually the judge and jury as to whether or not crisis scrap conditions will permit basic openhearth and blast furnace users to buy prohibited grades of scrap at premium prices. Amendment 7 also rubs out grade 30 (hard steel, 2 ft and under) from the roster of scrap listings.

The new revision states that premiums for grades 20 and 21 may be paid by blast furnace or basic openhearth users if NPA decides that allocations of these materials are necessary. Premiums for grades 11 through 18 may be charged to the two consumers if the shortage threatens a shutdown. NPA applies to OPS for permission to divert this scrap.

OPS' motive for the change is that steelmaking is threatened by shortages which could come to a painful climax of shutdowns if weather conditions suddenly turn adverse. Making these foundry grades available to steelmakers provides a slight cushion against want. While steelmakers are constantly being bedevilled by shortages, OPS feels, foundry need for crankshafts, gears, and other grade 30 materials is not so great as it has been. Ordinary premium grades can now substitute for grade 30.

Foundries are not pleased over this intrusion into their market. It is true that they have been experiencing a slight dip in business but defense will soon take up the slack, foundrymen warn. Then foundrymen will be in the allocations system with a vengence while steelmaking's gain of foundry scrap will be short-lived.

Steelmakers are willing to worry about this when the situation arises. Now, they desperately need an enlarged supply. NPA has the weight to divert foundry scrap to them and will do so.

Pittsburgh—Scrap supply has improved in this district. U. S. Steel Corp. last weekend returned to production two furnaces that had been shut down for lack of scrap. Three furnaces at Gary also were returned to production. At one time U. S. Steel had eight furnaces down. Cast scrap was in easy supply.

Chicago—While the market generally remained extremely tight, there were some evidences of weakening in demand in a few grades. Cast iron demand had fallen off previously. Last week dealer turnings, No. 2 bundles, and electric furnace scrap demand slackened slightly. Generally, however, demand continued high and dealers were able to move easily all grades. An indication of the increasing (however slight) availability of some scrap was the reopening of three openhearth furnaces at Gary. Mill inventories are still badly depleted.

Philadelphia—The new revisions in the scrap order are having little effect here. Grade 30 will hardly be missed since only a few cars of it have been shipped since it was established. Low phos foundry grades have eased a bit lately and cast is still soft although no under-ceiling sales have been reported.

New York—Amend. 7 to CPR 5, eliminating grade 30 and easing restrictions on grades 11 through 18 and 20 and 21 was greeted as beneficial by steel producers, but foundries anticipated their market tightening up. Some buyers are trying to pay under-the-ceiling for cast scrap and are trying to avoid paying trucking costs. No new major allocations were reported in this district.

Detroit — January-February have been comparatively quiet months in Detroit during most of the postwar era. This year, the seasonal decline plus forced curtailment of auto production caused the business cycle to sag to a point where even a scarce item like scrap could fall temporarily below ceiling prices. Foundry scrap is sick so, according to the trade, that it may later go below ceiling prices. There is caution here about making scrap commitments for electrics.

Cleveland—Scrap shipments picked up slightly last week due to more favorable weather conditions. One mill was reported to be expecting government allocations this week to stave off an extreme shortage. Blast furnace grades are said to be easier and being shipped to Pittsburgh and the East. One consumer is said to be buying only a limited amount, another is buying from customers only and a third is out of the market.

St. Louis—With better weather has come an improvement in scrap supplies. Farm collections are better, and the movement from the railroads has improved as track and dismantling work gets under way. The flow of scrap iron has also started to move from the automobile graveyards.

Birmingham—Although heavy melting scrap continues to come into southern scrap yards, brokers report the market is tightening up again. Majority of scrap that normally would come into the Birmingham district is being allocated to furnaces in the North.

Cincinnati—An easier tone pervaded the market last week, although it was difficult to ascribe it to any one cause. One mill was able to accumulate a little scrap due to shutdown of openhearths by threatening flood waters in the area. Little holdup of scrap movement was brought about by the flood. Some mills in response to the easier feeling were watching quality more carefully.

Boston — The markets, especially cast, have become less active as the foundries show less interest in purchases. Scrap is moving in a fair volume, but there is no rush of activity.

Buffalo—Scrap movement has shrunk drastically. Dealers report light tonnage outstanding on old allocation orders. Soft cast market manages to hold at ceilings.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

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Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →		$0.99	.75	.63	.63	.75	.75	.75	.61	.61	.75	.70	.78	.83	.85	.28	1.34	.78	.50	.20	.61	.51	.20	.62	.47	.51	.51	.61	.95	.50	.78	.60	.43	.61	.33	.57	.85	.85	.85	.85	.85
Basing Points →		Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minneapolis	Houston	Los Angeles	Pittsburg, Cal.	Portland, Ore.	San Francisco	Seattle
GRADES	OPS No.																																								
No. 1 bundles	1	$44.00							$44.00					$43.00				$42.50						$42.00					$41.00	$41.15	$40.00	$39.50	$39.00		$38.00	$37.00	$38.00				
No. 1 busheling	2	44.00							44.00					43.00				42.50						42.00					41.00	41.15	40.00	39.50	39.00		38.00	37.00	38.00				
No. 1 heavy melting	3	43.00							43.00					42.00				41.50						41.00					40.00	40.15	39.00	38.50	38.00		37.00	36.00	37.00				
No. 2 heavy melting	4	43.00							43.00					42.00				41.50						41.00					40.00	40.15	39.00	38.50	38.00		37.00	36.00	37.00				
No. 2 bundles	5	43.00							43.00					42.00				41.50						41.00					40.00	40.15	39.00	38.50	38.00		37.00	36.00	37.00				
Machine shop turnings	6	34.00							34.00					33.00				32.50						32.00					31.00	31.15	30.00	29.50	29.00		28.00	27.00	28.00				
Mixed borings and turnings	7	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00		32.00	31.00	32.00				
Shoveling turnings	8	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00		32.00	31.00	32.00				
Cast iron borings	10	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00		32.00	31.00	32.00				
No. 1 chemical borings	26	41.00							41.00					40.00				39.50						39.00					38.00	38.15	37.00	36.50	36.00		35.00	34.00	35.00				
Forge crops	11	51.50							51.50					50.50				50.00						49.50					48.50	48.65	47.50	47.00	46.50		45.50	44.50	46.00				
Bar crops and plate	12	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00		43.00	42.00	43.00				
Punchings and plate	14	46.50							46.50					45.50				45.00						44.50					43.50	43.65	42.50	42.00	41.50		40.50	39.50	40.50				
Electric furnace bundles	15	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00		40.00	39.00	40.00				
Cut struct., plate, 3 ft and less	16	47.00							47.00					46.00				45.50						45.00					44.00	44.15	43.00	42.50	42.00		41.00	40.00	41.00				
Cut struct., plate, 2 ft and less	17	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00		43.00	42.00	43.00				
Cut struct., plate, 1 ft and less	18	50.00							50.00					49.00				48.50						48.00					47.00	47.15	46.00	45.50	45.00		44.00	43.00	44.00				
Foundry steel, 2 ft and less	20	44.00							44.00					43.00				42.50						42.00					41.00	41.15	40.00	39.50	39.00		38.00	37.00	38.00				
Foundry steel, 1 ft and less	21	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00		40.00	39.00	40.00				
Heavy trimmings	24	43.00							43.00					42.00				41.50						41.00					40.00	40.15	39.00	38.50	38.00		37.00	36.00	37.00				
No. 1 RR heavy melting	RR 1	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00		40.00	39.00	37.00				
Scrap rails, random lengths	RR 14	48.00							48.00					47.00				46.50						46.00					45.00	45.15	44.00	43.50	43.00		42.00	41.00	39.00				
Scrap rails, 3 ft and less	RR 16	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00				
Scrap rails, 2 ft and less	RR 17	52.00							52.00					51.00				50.50						50.00					49.00	49.15	48.00	47.50	47.00		46.00	45.00	43.00				
Scrap rails, 18 in. and less	RR 18	54.00							54.00					53.00				52.50						52.00					51.00	51.15	50.00	49.50	49.00		48.00	47.00	45.00				
Rerolling rails	RR 15	53.00							53.00					52.00				51.50						51.00					50.00	50.15	49.00	48.50	48.00		47.00	46.00	44.00				
Uncut tires	RR 20	48.00							48.00					47.00				46.50						46.00					45.00	45.15	44.00	43.50	43.00		42.00	41.00	39.00				
Cut tires	RR 21	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00				
Cut bolsters and side frames	RR 23	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00		43.00	42.00	40.00				
RR specialties	RR 24, 28, 29	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00				
Solid steel axles	RR 25	58.00							58.00					57.00				56.50						56.00					55.00	55.15	54.00	53.50	53.00		52.00	51.00	49.00				
No. 3 steel wheels	RR 27	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00				
Unassorted	RR 35	40.00							40.00					39.00				38.50						38.00					37.00	37.15	36.00	35.50	35.00		34.00	33.00	31.00				

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runout or prepared cupola drops is 75 pct of corresponding grade.

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh: Bessemer, Homestead, Duquesne, Munhall. Cincinnati: Newport. St. Louis: Granite City, East St. Louis, Madison, and Federal, Ill. San Francisco: South San Francisco, Niles, Oakland. Claymont: Chester. Chicago: Gary.

SHIPPING POINT PRICES (Except RR scrap)—for shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 bundles (prime grade) in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap)—Ceiling on-line prices of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C and amend. 4, CPR 5.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Under Amend. 5 to CPR 5 ceiling prices are established for certain unprepared grades. Unprepared steel scrap for compression into No. 1 bundles calls for a $6 differential (or deduction) from the base (No. 1 bundles). Unprepared steel scrap for No. 2 bundles, $9 from base. Unprepared steel scrap other than material suitable for hydraulic compression, $8 from base. Sec. 7 (a) (2) (Railroad grades) is amended to include: Unprepared steel scrap other than material suitable for hydraulic compression, $8 from base.

COMMISSIONS — Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: **Nickel:** $1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. **Molybdenum:** $2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, $3 for content over 0.65 pct. **Manganese:** $4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., $14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. **Silicon:** electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. **Chromium:** $1 may be added if scrap conforms to SAE 52100 analysis. **Multiple Alloys:** if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTIONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rerolling rails, cupola cast, billet, bloom, and forge crops, Nos. 1 and 2 chemical borings.

See Amend. 5 to CPR 5 for setting of single price on No. 1 Heavy, No. 2, and No. 1 bundles. No. 1 bundles are made prime grade from which to add or subtract differentials. Amendment also puts dealer to dealer sales under ceilings, permitting a $1 resale margin, and trucking charges may be added only on shipments of prepared scrap.

Amend. 7 drops grade 30 from CPR 5 listing. Eases restrictions on payment of premiums by basic openhearth and blast furnace users on grades 11 through 18 and 20 and 21 under allocation and emergency conditions.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$3.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	3.00
Bar crops and plate, cast steel, punchings and plate, cut structural and plate; 3 ft and under, foundry steel, 2 ft and under, wrought iron	10.00
Structural, plate scrap, 2 ft and less, foundry steel 1 ft and less	11.00
Structural and plate scrap, 1 ft and less	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(Consumers buying prices, del'd gross ton)

Hvy. melting steel	$35.00
No. 1 bundles	35.00
No. 2 bundles	34.50
Mechanical bundles	33.00
Mixed, steel scrap	31.00
Rails, remelting	35.00
Rails, rerolling	38.00
Bushelings	30.00
Bushelings, prepared new factory	33.00
Bushelings, unprepared new factory	28.00
Short steel turnings	32.00
Mixed borings, turnings	32.00
Cast scrap	55.00

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Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Feb. 5, 1952	Jan. 29, 1952	Jan. 8, 1952	Feb. 6, 1951
Hot-rolled sheets	3.60	3.60	3.60	3.60
Cold-rolled sheets	4.35	4.35	4.35	4.35
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.80
Hot-rolled strip	3.50	3.50	3.50	3.50
Cold-rolled strip	4.75	4.75	4.75	4.75
Plate	3.70	3.70	3.70	3.70
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	36.75	36.75	36.75	36.50
Tin and Ternplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes.	$8.70	$8.70	$8.70	$8.70
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	7.40
Special coated mfg. ternes	7.50	7.50	7.50	7.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.70
Cold finished bars	4.55	4.55	4.55	4.55
Alloy bars	4.30	4.30	4.30	4.30
Structural shapes	3.65	3.65	3.65	3.65
Stainless bars (No. 302)	31.50	31.50	31.50	31.25
Wrought iron bars	9.50	9.50	9.50	9.50
Wire (cents per pound)				
Bright wire	4.85	4.85	4.85	4.85
Rails (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.60
Light rails	4.00	4.00	4.00	4.00
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$56.00
Slabs, rerolling	56.00	56.00	56.00	56.00
Forging billets	66.00	66.00	66.00	66.00
Alloy blooms, billets, slabs	70.00	70.00	70.00	70.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	4.10
Skelp	3.35	3.35	3.35	3.35

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Feb. 5, 1952	Jan. 29, 1952	Jan. 8, 1952	Feb. 6, 1951
Foundry, del'd Phila.	$57.97	$57.97	$57.97	$57.77
Foundry, Valley	52.50	52.50	52.50	52.50
Foundry, Southern, Cin'ti	55.58	55.58	55.58	55.58
Foundry, Birmingham	48.88	48.88	48.88	48.88
Foundry, Chicago†	52.50	52.50	52.50	52.50
Basic del'd Philadelphia	57.09	57.09	57.09	56.92
Basic, Valley furnace	52.00	52.00	52.00	52.00
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese‡	186.25	186.25	186.25	186.25

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$43.00*	$43.00*	$43.00*	$51.13
No. 1 steel, Phila. area	41.50*	41.50*	41.50*	47.50
No. 1 steel, Chicago	41.50*	41.50*	41.50*	44.63
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	40.25
Low phos. Young'n	46.50*	46.50*	46.50*	54.50
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	67.75
No. 1 cast, Philadelphia	49.00†	49.00†	49.00†	62.50
No. 1 cast, Chicago	49.00†	49.00†	49.00†	63.00

* Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.25
Foundry coke, prompt	17.75	17.75	17.75	17.25

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.03	$1.825
Zinc, East St. Louis	19.50	19.50	19.50	17.50
Lead, St. Louis	18.80	18.80	18.80	16.80
Aluminum, virgin	19.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	53.55
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	50.00	50.00	50.00	42.00

†Tentative.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.

	Finished Steel Base Price	Pig Iron	Scrap Steel
Feb. 5, 1952	4.131¢ per lb.	$52.72 per gross ton.	$42.00 per gross ton.
One week ago	4.131¢ per lb.	52.72 per gross ton.	42.00 per gross ton.
One month ago	4.131¢ per lb.	52.72 per gross ton.	42.00 per gross ton.
One year ago	4.131¢ per lb.	52.69 per gross ton.	47.75 per gross ton.

	Finished Steel Base Price High		Finished Steel Base Price Low		Pig Iron High		Pig Iron Low		Scrap Steel High		Scrap Steel Low	
1952	4.131¢	Jan. 1	4.131¢	Jan. 1	$52.72	Jan. 1	$52.72	Jan. 1	$42.00	Jan. 1	$42.00	Jan. 1
1951	4.131¢	Jan. 2	4.131¢	Jan. 2	52.72	Oct. 9	52.69	Jan. 2	47.75	Jan. 30	42.00	Oct. 23
1950	4.131¢	Dec. 1	3.837¢	Jan. 3	52.69	Dec. 12	45.88	Jan. 3	45.13	Dec. 19	26.25	Jan. 3
1949	3.837¢	Dec. 27	3.3705¢	May 3	46.87	Jan. 18	45.88	Sept. 6	43.00	Jan. 4	19.33	June 28
1948	3.721¢	July 27	3.193¢	Jan. 1	46.91	Oct. 12	39.58	Jan. 6	43.16	July 27	39.75	Mar. 9
1947	3.193¢	July 29	2.848¢	Jan. 1	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50	May 20
1946	2.848¢	Dec. 31	2.464¢	Jan. 1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17	Jan. 1
1945	2.464¢	May 29	2.396¢	Jan. 1	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	1892	May 22
1944	2.396¢		2.396¢		$23.61		$23.61		19.17	Jan. 11	15.76	Oct. 24
1943	2.396¢		2.396¢		23.61		23.61		$19.17		$19.17	
1942	2.396¢		2.396¢		23.61		23.61		19.17		19.17	
1941	2.396¢		2.396¢		$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$19.17	Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept.19	20.61	Sept.12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	32.25	Mar. 9	20.25	Feb. 16	21.92	Mar.30	12.67	June 9
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug.11	17.75	Dec. 21	12.67	June 8
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 9

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

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2

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IT PAYS TO READ IRON AGE ADS TOO!

Exports

Still Able to Export Machinery

American industry is showing strength on two fronts. While it is coping with the big job of supplying machinery and equipment to a demanding home market, it is still making substantial exports.

The record of E. W. Bliss Co.'s Rolling Mill Div., at Salem, Ohio, is an example. Shipments from Bliss factories have soared to $7.5 million in the past 4 years.

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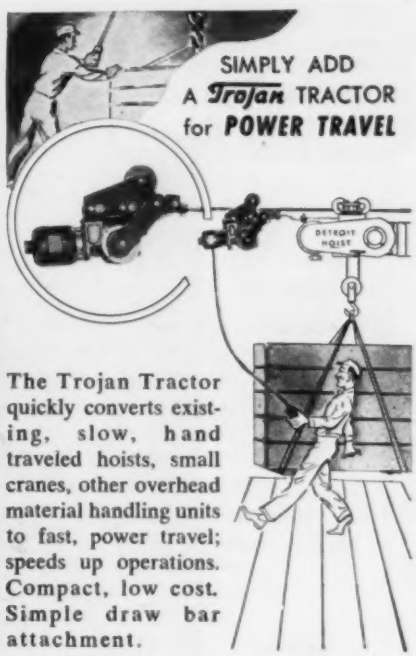

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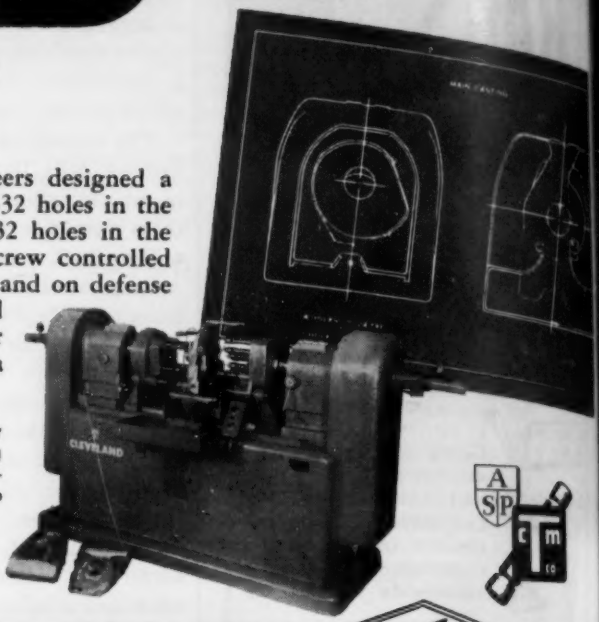

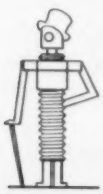

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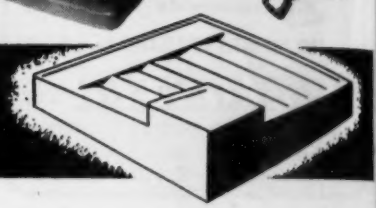

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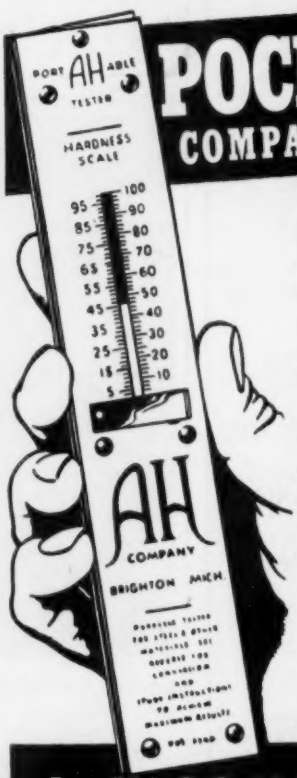

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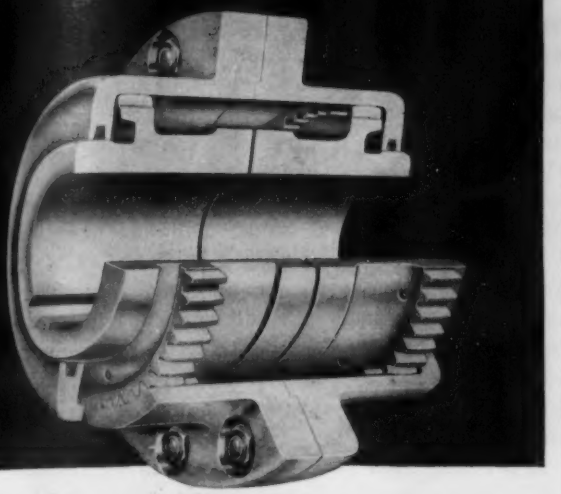

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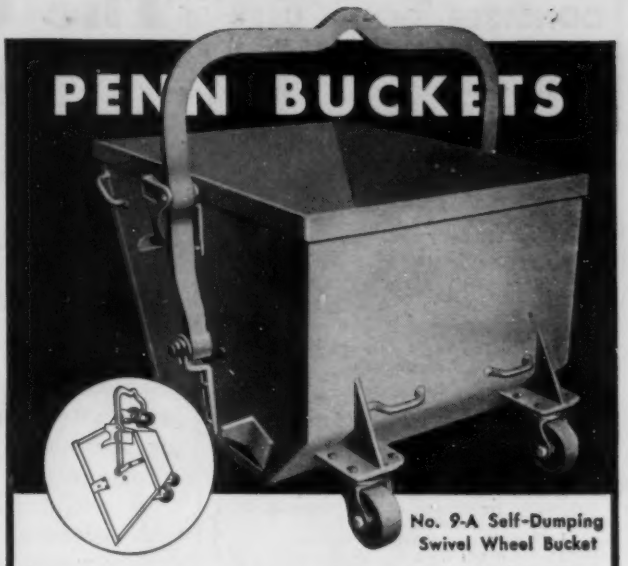

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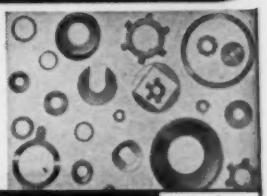

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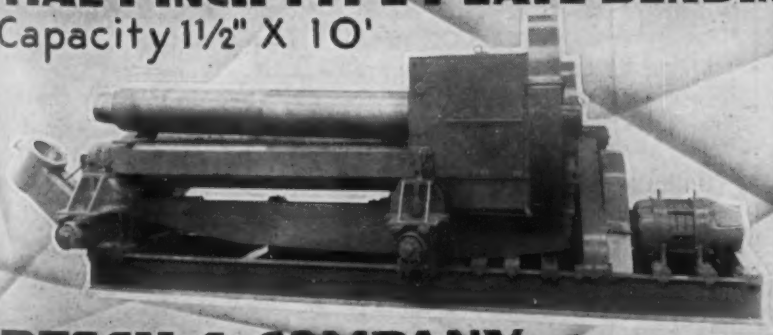

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The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Office of Price Stabilization again confirms that revisions will be made to Ceiling Price Reg. 80 (pricing order for used machine tools). That agency also has told THE IRON AGE that work is continuing on the price book, listing prices of new machine tools. New prices after Jan. 25, 1951, are being assembled.

Some in the trade believed that OPS would issue a price book with outdated prices and that dealers would apply some percentage formula to bring used prices up to their proper levels. It is also probable that in revising CPR 80, OPS will set a new base period date—later than the present one of Jan. 25.

Also Inflated—This will recognize that used machine tools were under the same inflationary pressures as new tools. It will also recognize that used machine tools did not stand still, pricewise, while new machine tool prices rose.

Raising the base period to a more realistic plane also answers the charges of many used machine tool dealers that CPR 80 was a violation of the Capehart Amendment because prices in some cases were under par.

Air Power—The Air Force appears to have been caught between the devil and the deep blue sea in ordering machine tools. This was made obvious when National Production Authority instructed General Motors to postpone plans to build $69 million worth of vertical turret lathes pending study. NPA later stressed that GM would not lose by any cutbacks in production of Bullard tools. Other defense work would substitute.

Holding Tendencies—Some dealers who complain that the market is lagging say that coming changes in CPR 80 permitting higher prices for used machine tools may play a part. Better prices in the near future develops holding tendencies on the part of both sellers and buyers.

Plant owners with tools may in some cases be waiting for an improvement in the pricing structure. But the principal reason no great influx of desired used machine tools enters the market is because the field has been thoroughly combed. Greater productive capacity of American industry and the expectation that for the next few years production will swing heavily to defense also prompts plant owners to hold.

Anti-Controls — Dealers who hate controls in any shape or form will pin blame for drying up of machine tool sources to pricing restrictions. There is not enough of a profit incentive for plant owners. And to prove this some reports have been circulating of tool owners dickering with dealers for some under-the-table negotiations. This is discouraged by the used machine tool trade because of its responsibility to the country.

War Doubts—Some in the trade are beginning to doubt that the great new era of defense production will help the used machine tool market very much. They argue that most of the prime contractors have either completed their war work tooling up or are in the latter stages.

They say that never before have so many machine tools been in the hands of industry and the subcontracting that is bound to develop in larger volume later will be accommodated for the most part on facilities that are already available.

They do not say that increased subcontracting will do nothing for the market but its wholesome effects will be limited. Chances of any enthusiastic purchasing of older type used machine tools are diminishing, they point out.

The stretching out of defense production schedules also emasculates buying demand, they say.

THE CLEARING HOUSE

U.S.A.
REST OF WORLD
1,292
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POUNDS OF STEEL PER PERSON

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Today we drive 40 million cars, listen to 90 million radios, keep food in 33 million refrigerators.

Yet millions in the rest of the world are still groping in the primitive darkness of 40 years ago.

Why have we moved ahead? Competition is a chief reason. Only competition in business has made luxuries commonplace in your home today. Competition, for example, in the production and sale of steel and things made out of steel.

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How well does this competition of ours work in the steel business?

. . . The U.S.A. shows an 83.4% gain in steel output between 1939 and 1950. The rest of the world shows an 0.8% loss.

. . . In 1939, the U.S.A. under "competition" made ⅓ of all the world's steel. Today we produce half—all with only 6% of the people in the world.

. . . Steel workers under "competition" gained in jobs, too. There were 449 thousand jobs in 1939. Today—637 thousand.

The steel industry is just one example of how a free competitive system works. Ours is the security millions of people in the world dream of when they embrace such dead-ends as "planned economies".

Look around and see what happens when people hand their jobs and factories over to the government. Or have them taken by law. Or by force. Name it what you will—"communism", "nationalization", "socialism", "regimentation"—it is a one-way street, and no turning back. By then people no longer own government. Government owns the people.

• • •

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Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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Fresh-roasted Chisels Halt Costly Breakage

A foundry in the Middle West had long depended on a rule-of-thumb heat-treater to harden the large number of chisels they used daily. One day he quit abruptly. No great concern was felt about his departure—until they began to break as many as 300 chisels in one day.

A trouble-shooter, hurriedly summoned, soon traced the appalling breakage to the as-quenched brittleness of the chisels. The departed heat-treater hadn't revealed how he relieved this condition. The trouble-shooter went on to explain that the chisels had to be tempered after hardening. But there was no suitable heat-treating equipment in the foundry. Suddenly he hit on the answer. "Tell you what—you can get one of those electric turkey roasters. They cost only about twenty-five bucks and they'll give you a tempering range of about 250 to 500 F. Just what you need."

The division foreman was dubious. How could roasting the chisels do any good? But he bought a roaster and put it on the job. To his surprise it cured the breakage. In the first week they averaged only one broken chisel a day. The roaster paid for itself in no time.

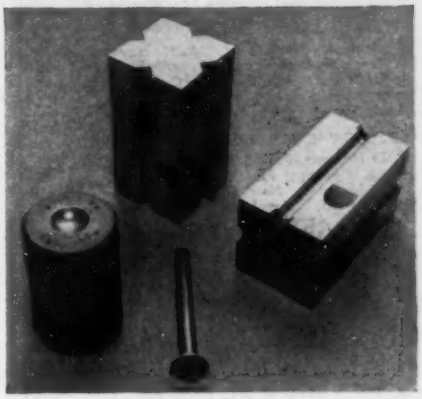
Many tools and dies fail because they haven't been tempered after hardening. Let holding tools at the tempering temperature long enough causes the same sort of trouble. Another important point: always temper tools before they cool down to room temperature. Usually it's best not to let them cool below 150 F.

Cold-heading Die Steel Takes a Real Beating

Maybe you've seen a cold-heading machine in action, forging bolts, rivets, screws, and other products at high speed. The tools and dies which do the cutting, gripping, and heading have to be seen at work to be appreciated. Minute after minute, day after day, they withstand continuous terrific pounding.

Good cold-heading die steel—used for the solid, open, and header types of dies—must have a hard, long-wearing surface, reinforced by a tough core. The hard, wear-resisting case must be deep enough to prevent sinking or upsetting and tough enough to absorb heavy pounding without chipping or spalling.

Cold-heading die steel is one of our special-purpose tool steels. It took quite a few years to work out the right carbon content, depth of hardness, and grain size. For example, we've found that a shallow-hardening steel is best for header dies up to 2-in. diameter; for larger dies a deep-hardening steel gives longer service. Both are fine-grained tool steels, made ever so carefully to insure the ultimate in cleanliness and freedom from injurious defects.



These gripper and header dies of Bethlehem Cold-Heading Die Steel have the ideal combination of hard surface and tough core for cold-heading thousands of bolts each day.

We call it Bethlehem XX Cold-Heading Die Steel. It's really tops for this kind of punishing service. Like to know more about it? Address your request to our Publications Department, Bethlehem, Pa. Ask for Booklet 261.

Our Tool Steel Engineer Says:

A modified oil-quench gets rid of scale on air-hardening tool steels

Some toolmakers object to air-hardening steels because a thin, adherent scale may form during the air-quench. Avoiding this scale is really easy.

Quench the tool or die in oil until it just loses color . . . 900 to 1000 F . . . then cool it in air to about 150 F, followed by the usual tempering operation. The oil-quench will "throw" the scale. But the tool won't crack, because air-hardening steels do not begin to transform, or harden, until they reach 400 F or less.

However, air-hardening steels must *not* be quenched in oil long enough to cool them down below the temperature at which transformation takes place. If this precaution is ignored, cracking of the tool is likely to result.

Air-quenching, of course, results in the minimum amount of distortion.

Bethlehem ULTRASONIC TESTED **Tool Steel**

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